

mobile sources and reporting the measure both in absolute and normalized terms using population. CMAP stated that the EPA's Motor Vehicle Emissions Simulator (MOVES) or a simplified speed-emissions rate lookup table based on MOVES could be used to help address the concerns that the original measure calculation (using VMT and fuel sales to calculate CO<sub>2</sub> emissions) is not sophisticated enough to capture some of the nuances of CO<sub>2</sub> emissions.

The Western Connecticut Council of Governments<sup>76</sup> recommended FHWA work with EPA to expand the existing transportation-conformity process that EPA oversees, and in which State DOTs and MPOs participate, to include CO<sub>2</sub> emissions. They thought there was the potential for the benefit-cost ratio of such an extension to be more favorable than the creation of a GHG performance measure under Title 23. They also discussed the benefits of voluntary measures, such as allowing States' focus to remain on requirements relating to other performance measures while also allowing for policy experimentation, innovation, and peer learning.

In addition to alternatives submitted by commenters, FHWA considered directly publishing CO<sub>2</sub> emissions trend information as an alternative means to achieve the outcomes FHWA expected from the GHG measure. Under this alternative, FHWA would calculate trend information using much the same methodology as the GHG measure, though the trend information would not involve any performance targets. This alternative would not use a "measure and target" framework, which is required in the performance management program under section 150. For that reason, adopting this alternative would result in the repeal of the GHG measure.

#### FHWA Response

None of the alternatives provide a way to modify the GHG measure while retaining it as part of the national performance management program at this time. The alternative proposed by AMPO would have a Federal agency calculate the measure for each State DOT and MPO. FHWA agrees that a single Federal or private entity could calculate the measure based on fuel sales. However, the State DOTs and MPOs still would have to carry out the remaining activities required for the national performance management program. These include setting their CO<sub>2</sub> emissions targets (a local, not a

Federal, decision), reporting to FHWA on progress toward their targets, and determining a plan of action to make progress toward their selected targets if they failed to make significant progress during a performance period.<sup>77</sup> Therefore, having FHWA or EPA calculate the measure would not substantially reduce the overall burden on States or MPOs.

In addition, with respect to CMAP's comments on using MOVES to calculate the measure, FHWA considered this suggestion during the PM3 rulemaking. FHWA elected to use fuel sales to calculate the measure, instead of MOVES, because such a requirement to use MOVES would create an extra burden for State DOTs and MPOs that do not currently use that model. One of the reasons FHWA is repealing the GHG measure through this rulemaking is to reduce the burdens on State DOTs and MPOs. Switching to the use of MOVES would likely increase, not decrease, the burdens imposed on State DOTs and MPOs by the GHG measure.

FHWA interprets the Western Connecticut Council of Governments' comment as suggesting it might be more beneficial if the transportation air quality conformity program, rather than the national performance management program, were used to address CO<sub>2</sub> emissions in transportation. FHWA believes this comment supports its decision to remove the GHG measure from the national performance management program. EPA has used the conformity program to mandate changes in emissions levels of pollutants subject to conformity. FHWA defers to EPA on whether adding CO<sub>2</sub> emissions to the conformity program is an appropriate action.

FHWA acknowledges the Western Connecticut Council of Governments' suggestion that the voluntary use of a GHG performance measures might prove useful, but FHWA does not believe a voluntary measure can be included in the national performance management program. Making the GHG measure voluntary would require FHWA to establish a new category for voluntary measures, create a set of procedures for voluntary measures, and exempt voluntary measures from certain parts of the existing performance management regulations in 23 CFR part 490. FHWA is also concerned that an attempt to accommodate voluntary performance measures in the national performance management program could cause confusion among stakeholders, including State DOTs, MPOs, and the public. Such confusion would be

harmful to the national performance management program. FHWA encourages State DOTs and MPOs to continue to establish and use performance measures independent of the national performance management program, as many have done for a long time.

In addition to alternatives suggested by commenters, FHWA considered the alternative of having FHWA provide CO<sub>2</sub> emissions information directly. Under this alternative, FHWA would directly calculate the State-by-State trends and publish the information, which would eliminate requirements for State DOTs and MPOs to implement the GHG measure. This alternative could have the some of the influencing effects FHWA described in the PM3 Final Rule, although this alternative has some potential to result in lower levels of engagement by State DOTs and MPOs than alternatives that retain a GHG measure. This alternative would require FHWA to provide some additional administrative resources, or reallocate existing resources that FHWA currently uses for other work. Like State DOTs, FHWA operates in a resource-constrained environment. FHWA declines to adopt this alternative at this time.

#### F. Other Comments

##### 1. Legal Authority for the GHG Measure

Roughly one in ten commenters submitted opinions on FHWA's legal authority to establish this rule. Eleven commenters<sup>78</sup> stated that FHWA does have the authority; whereas, twelve commenters<sup>79</sup> had the opposite opinion. A number of commenters suggested that FHWA has authority to regulate, arguing that a GHG measure is

<sup>78</sup> Metropolitan Council, FHWA-2017-0025-0140-1; Association of Pedestrian and Bicycling Professionals, FHWA-2017-0025-141-1; Minnesota DOT, FHWA-2017-0025-0149-2; Metropolitan Area Planning Council, FHWA-2017-0025-0150; Caltrans and CARB, FHWA-2017-0025-0162-7 and -8; Straw, FHWA-2017-0025-0173; Joint submission led by NRDC (12), FHWA-2017-0025-190-1 and -2; mass comment campaign led by U.S. PIRG (mayors) (66), FHWA-2017-0025-0192; Attorneys General of CA, MD, OR, VT, WA, and MA, FHWA-2017-0025-0199-3; Transportation for America, FHWA-2017-0025-0200-1 and -3; Colorado DOT, FHWA-2017-0025-0208-3.

<sup>79</sup> Arkansas DOT, FHWA-2017-0025-0054; Michigan DOT, FHWA-2017-0025-0070; DOTs of ID, MT, ND, SD, and WY, FHWA-2017-0025-0125; Texas DOT, FHWA-2017-0025-0127; Michigan DOT, FHWA-2017-0025-0134; Nebraska DOT, FHWA-2017-0025-0146; Montana DOT, FHWA-2017-0025-0153; National Ready Mixed Concrete Association, FHWA-2017-0025-0159-2; Joint submission led by American Highway Users Alliance (38), FHWA-2017-0025-0196-3; AGC, FHWA-2017-0025-0213-1; ARTBA, FHWA-2017-0025-0246-1; Tennessee DOT, FHWA-2017-0025-0258.

<sup>76</sup> Western Connecticut Council of Governments, FHWA-2017-0025-0240-1.

<sup>77</sup> See 23 CFR 490.105, 490.107, 490.109.

authorized by 23 U.S.C. 150 and other Title 23 statutes, reiterating the same reasons articulated in the PM3 rulemaking.<sup>80</sup> One commenter<sup>81</sup> stated the EPA's endangerment finding<sup>82</sup> for CO<sub>2</sub> emissions provides FHWA with legal authority to regulate CO<sub>2</sub> emissions.

Most of the comments received in this rulemaking stating that FHWA does not have legal authority to adopt a GHG measure recited the same reasons as comments received during the PM3 rulemaking.<sup>83</sup> These comments pointed to the language in 23 U.S.C. 150(c)(2)(C) that limits FHWA authority to adopting performance measures described in that statute. Given that GHG is not expressly mentioned anywhere in the statute, the commenters viewed a GHG measure as prohibited by 23 U.S.C. 150(c)(2)(C). Some commenters noted that while 23 U.S.C. 150(c)(5) calls for an emissions measure, that provision is tied to the CMAQ program. Because CO<sub>2</sub> emissions are not a criteria pollutant targeted by the CMAQ Program, the commenters concluded 23 U.S.C. 150(c)(5) could not provide a legal basis for a GHG measure.<sup>84</sup>

Two joint submissions<sup>85</sup> stated that principles of statutory construction barred FHWA from adopting a GHG performance measure. The commenters pointed out that Congress expressly addressed emissions in 23 U.S.C. 150(c)(5). Applying the statutory construction principle that "the specific governs the general," the commenters concluded that Congress expressly stated how to address emissions in 23 U.S.C. 150(c)(5), and that nothing in the remainder of 23 U.S.C. 150(c) provided other authority to regulate emissions.

Finally, the Michigan DOT<sup>86</sup> pointed out that GHGs are not criteria air

pollutants targeted by CMAQ funding and expressed concern about the precedent that would be set if FHWA were to establish a performance measure for which Congress did not designate any funding.

#### FHWA Response

FHWA appreciates the many comments received in this rulemaking on the question of FHWA's legal authority. Please see our resolution of the legal authority issue above in Section IV.B.1.

#### 2. Legal Duty To Adopt a GHG Measure

Two submissions<sup>87</sup> stated that FHWA has a duty to adopt a GHG measure. One<sup>88</sup> described FHWA's obligation to use "unenumerated performance criteria" when such measures are "appropriate or necessary to further Congress's purposes." That commenter also stated that emissions that cause climate change would be a critical aspect of NHS performance in the future, and that it would be "contrary to the statute, and to the record, for the FHWA to decline to exercise its discretion to include" a GHG measure.

#### FHWA Response

FHWA does not believe that a GHG measure is mandated by 23 U.S.C. 150(c). As noted by commenters in this rulemaking, there is no explicit reference to a GHG measure in 23 U.S.C. 150(c). Thus, adoption of a GHG measure rested entirely on FHWA's discretion to interpret 23 U.S.C. 150(c). As discussed in the legal authority section in Section IV.B.1, FHWA has concluded, upon reconsideration, that the better reading of the statute does not encompass the GHG measure.

#### 3. Administrative Procedure Act Concerns

We received a joint comment from State Attorneys General<sup>89</sup> arguing that repealing the GHG measure would be arbitrary and capricious under the Administrative Procedure Act (APA). The comment claimed that FHWA's NPRM had not provided sufficient justification to repeal the measure, and FHWA could not provide the reasoned analysis needed to support a repeal of the GHG measure. The comment also stated that FHWA must consider alternative solutions to address alleged problems with the GHG measure, rather

than repealing it. Two other commenters<sup>90</sup> noted similar APA concerns, with one<sup>91</sup> stating that a repeal would be inconsistent with "relevant executive orders," based on a comparison of the cost analysis in the PM3 Final Rule and the cost analysis in the NPRM for this rulemaking.

#### FHWA Response

FHWA has examined the relevant data and other information, and carefully considered the comments received, as outlined in this document. FHWA has examined the facts and has provided a reasoned explanation for the repeal of the GHG measure consistent with APA requirements, as detailed throughout this preamble.

#### 4. Rulemaking Concerns

FHWA received comments<sup>92</sup> concerning the comment period, requesting an extension or otherwise stating the 30-day comment period was inadequate. Four commenters<sup>93</sup> stated that FHWA should issue a new, full NPRM to effectuate the repeal to better define the proposed regulatory action, and allow for broad comment on the specifics of a proposed policy.

#### FHWA Response

FHWA considered the comments stating FHWA should have provided a 90-day comment period for this rulemaking, questioning whether the proposed regulatory action and related matters were adequately described in the NPRM, and suggesting FHWA should have engaged in additional rulemaking to seek comments on certain topics not specified in the NPRM.

While FHWA sometimes uses a 90-day comment period in its rulemaking proceedings, that length of time is not required. In this instance, FHWA received not only comments asking for a longer comment period, but also comments asking for a quick decision so States could have certainty about the national performance measures. FHWA did provide a short extension of the 2017 comment period, from November 6 to November 15. However, FHWA

<sup>80</sup> "National Performance Management Measures: Assessing Performance of the National Highway System, Freight Movement on the Interstate System, and Congestion Mitigation and Air Quality Improvement Program" (RIN 2125-AF54); <https://www.gpo.gov/fdsys/pkg/FR-2017-01-18/pdf/2017-00681.pdf>.

<sup>81</sup> Isbell, FHWA-2017-0025-0169.

<sup>82</sup> <https://www.gpo.gov/fdsys/pkg/FR-2009-12-15/pdf/E9-29537.pdf>.

<sup>83</sup> "National Performance Management Measures: Assessing Performance of the National Highway System, Freight Movement on the Interstate System, and Congestion Mitigation and Air Quality Improvement Program" (RIN 2125-AF54); <https://www.gpo.gov/fdsys/pkg/FR-2017-01-18/pdf/2017-00681.pdf>.

<sup>84</sup> DOTs of ID, MT, ND, SD, and WY, FHWA-2017-0025-0125-3; Texas DOT, FHWA-2017-0025-0127-2; Joint submission led by American Highway Users Alliance (38), FHWA-2017-0025-0196-3; ARTBA, FHWA-2017-0025-0246-3.

<sup>85</sup> DOTs of ID, MT, ND, SD, and WY, FHWA-2017-0025-0125-3; Joint submission led by American Highway Users Alliance (38), FHWA-2017-0025-0196-3.

<sup>86</sup> Michigan DOT, FHWA-2017-0025-0070-1.

<sup>87</sup> Caltrans and CARB, FHWA-2017-0025-0162-7; Attorneys General of CA, MD, OR, VT, WA, and MA, FHWA-2017-0025-0199-5.

<sup>88</sup> Caltrans and CARB, FHWA-2017-0025-0162-7.

<sup>89</sup> Attorneys General of CA, MD, OR, VT, WA, and MA, FHWA-2017-0025-0199-4.

<sup>90</sup> Straw, FHWA-2017-0025-0173; Joint submission led by NRDC (12), FHWA-2017-0025-0190-1 and -3.

<sup>91</sup> Joint submission led by NRDC (12), FHWA-2017-0025-0190-1 and -3.

<sup>92</sup> Joint submission led by Clean Air Carolina (4), FHWA-2017-0025-0027; City of New York Law Department, FHWA-2017-0025-0060; Joint submission led by Clean Air Carolina (4), FHWA-2017-0025-0027; City of New York Law Department, FHWA-2017-0025-0060.

<sup>93</sup> Schroeckenthale, FHWA-2017-0025-0030; Oregon DOT, FHWA-2017-0025-0152-1; Caltrans and CARB, FHWA-2017-0025-0162-12; Denver Regional Council of Governments, FHWA-2017-0025-0163.



concluded the comment period represented a reasonable balance of the various concerns and declined to further extend the time for comment.

FHWA reviewed the NPRM in response to the suggestions that the NPRM did not meet APA requirements for notice of the proposed regulatory action. FHWA concluded the NPRM provides adequate notice of the proposal. The NPRM describes the history of the GHG measure, some of the concerns identified by commenters in the PM3 rulemaking, the reasons FHWA was proposing a repeal, and a request for comments on specific questions and on whether FHWA should take an action other than repeal (*i.e.*, retain or revise the GHG measure). The NPRM included the regulatory language needed for a repeal of the measure. Considered together, these elements provided more than adequate notice that FHWA was considering repeal of the GHG measure due to various concerns, including policy changes, reconsideration of the legal authority for the measure, implementation costs and other regulatory burdens, lack of precision in the measure, lack of utility of the measure, and duplication of requirements. FHWA received comments in this rulemaking on all of these topics. FHWA concluded no additional rulemaking proceeding is needed before FHWA makes a decision on the GHG measure.

## 5. Environmental Reviews

Caltrans and the CARB<sup>94</sup> jointly argued that, because repeal would result in increased CO<sub>2</sub> emissions and exacerbation of climate change, FHWA may not repeal the GHG performance measure without considering the implications of such a repeal on “many affected resources and communities.” The commenters asserted that the required analytic considerations, include, but are not limited to, the following: A full environmental impact statement (EIS) pursuant to the National Environmental Policy Act (NEPA); analysis and consultation under the Endangered Species Act (ESA); review under the National Historic Preservation Act (NHPA); review under Executive Order 13211; and review under Executive Order 12898.

## FHWA Response

Repeal of the GHG measure does not require an EIS or the other reviews called for by the comment. The commenters incorrectly conclude that

the repeal of the measure would “result in increased GHG emissions.”<sup>95</sup>

As a matter of law, the 23 U.S.C. 150 performance measures are part of a congressionally mandated performance management system intended to provide a means to the most efficient investment of Federal transportation funds by refocusing on national transportation goals, increasing the accountability and transparency of the FAHP, and improving project decisionmaking through performance-based planning and programming. The planning statutes incorporate performance management into the metropolitan and statewide transportation planning processes.<sup>96</sup> Those statutes call for use of the performance measures and targets adopted pursuant to 23 U.S.C. 150(c) and (d) to assess performance and progress towards critical outcomes for the States and regions of the MPOs, not to regulate State and MPO activities. Performance management, together with asset management plans prepared pursuant to 23 U.S.C. 119, and other State plans, feed into the metropolitan and statewide transportation planning process that States DOTs and MPOs use to identify their investment priorities.<sup>97</sup> The performance measures and resulting targets are planning and administrative activities that do not involve or lead directly to construction. The comprehensive, interrelated, planning-based nature of this system is evident in MAP-21, where Congress addressed metropolitan and statewide planning and performance management together in their own subtitle of the reauthorization legislation.<sup>98</sup>

As previously described, the GHG measure relies on influencing the behavior of State DOTs and MPOs. It does not require any action by those entities to reduce CO<sub>2</sub> emissions. The repeal of the GHG measure cannot be determined to cause increases in CO<sub>2</sub> emissions because the GHG measure has no legal power to force any change in CO<sub>2</sub> emission levels under 23 U.S.C. 150, and the GHG measure does not have a predictable effect on those emissions. State DOTs and MPOs were free to choose targets that reflect an increase, a decrease, or static levels of CO<sub>2</sub> emissions. The GHG measure required limited actions from State DOTs and MPOs, and those actions are administrative in character.<sup>99</sup> The

measure, which did not set any regulatory limit or emissions target, relied on the potential that it may produce an “influencing” effect on third-party behavior.<sup>100</sup> But acting to influence others is different from an action that imposes a requirement to meet an emissions limit, or otherwise commands State DOTs and MPOs to produce a specific outcome with respect to CO<sub>2</sub> emissions. It is not possible to determine whether the behavior of third parties will change as a result of the retention, modification, or repeal of the GHG measure, or to what degree a change in third-party behavior will have any effect on CO<sub>2</sub> emissions. None of the laws cited by the commenter require FHWA to engage in such speculation.

The impacts of Title 23-funded projects and programs selected by State DOTs and MPOs through the metropolitan and statewide planning process are subject to NEPA and other reviews listed in the comment prior to the project’s implementation. That is the correct point in the process for such reviews, as that is the time when potential impacts can be determined with reasonable accuracy. Thus, there is no basis now for the reviews that the commenters seek. Rather than “escaping” evaluation as commenters contend, these issues can be addressed at an appropriate time in connection with the particular projects or programs. Please see Section VI.G. of this document for FHWA’s regulatory analysis conducted pursuant to NEPA.

## VI. Rulemaking Analyses and Notices

*A. Executive Order 13771 (Reducing Regulations and Controlling Regulatory Costs), Executive Order 12866 (Regulatory Planning and Review), Executive Order 13563 (Improving Regulation and Regulatory Review), and DOT Regulatory Policies and Procedures*

FHWA has determined that this action is a significant action within the meaning of Executive Order (E.O.) 12866 and within the meaning of DOT regulatory policies and procedures. However, it is anticipated that the economic impact of this rulemaking will not be economically significant within the meaning of E.O. 12866 as discussed below. This action complies with E.O.s 12866, 13563, and 13771 to improve regulation. This action is considered significant because of widespread

levels, as compared to a 2017 baseline. State DOTs must use data from existing sources to calculate the CO<sub>2</sub> emissions measure at various points in time, reporting the results to FHWA. If the State DOT does not meet its target, it must report to FHWA on actions the State DOT will take to reach its selected target.

<sup>100</sup> 82 FR at 5975–76.

<sup>94</sup> Caltrans and CARB, FHWA–2017–0025–0162.

<sup>95</sup> Caltrans and CARB, FHWA–2017–0025–0162.

<sup>96</sup> See 23 U.S.C. 134(h)(2) and 135(d)(2).

<sup>97</sup> See 23 CFR 450.206(c)(4)–(5) and 450.306(d)(2) and (4).

<sup>98</sup> See Map-21, Subtitle B, Sections 1201–1203.

<sup>99</sup> State DOTs and MPOs must set CO<sub>2</sub> emissions targets, which can be for declining emission levels, increasing emission levels, or unchanged emission

public interest in the transformation of the FAHP to be performance-based, although it is not economically significant within the meaning of E.O. 12866.

FHWA considers this final rule to be an E.O. 13771 deregulatory action, resulting in \$1.67 million in annualized cost savings at a 7 percent discount rate. Details on the estimated cost savings of this final rule are presented in the RIA, which may be accessed from the docket (docket number FHWA–2013–0054). The RIA evaluates the economic impact,

in terms of costs and benefits, on Federal, State, and local governments, as well as private entities regulated under this action, as required by E.O. 12866 and E.O. 13563. However, the RIA is unable to quantify any changes from improved decisionmaking that would result in benefits if the GHG measure requirement were retained.

#### Estimated Cost Savings of Repealing the GHG Measure

To estimate cost savings of this final rule, FHWA assessed the level of effort

that would have been needed to comply with each section under the PM3 rule with respect to the now-repealed GHG measure. These costs are expressed in labor hours and the labor categories for those needed to implement the GHG measure. Level of effort by labor category is monetized with loaded wage rates to estimate total costs.

Table 2 displays the total cost savings of this final rule for the 9-year study period (2018–2026) and the corresponding annualized values.

TABLE 2—TOTAL COST SAVINGS OF THE RULE

Cost components	9-Year total cost *		Annualized cost	
	7%	3%	7%	3%
Section 490.105–490.109—Reporting Requirements .....	\$9,090,263	\$10,652,791	\$1,395,232	\$1,368,179
Establish and Adjust GHG Targets .....	6,368,958	7,392,818	977,549	949,488
Reporting on GHG Targets and Progress Toward Them .....	2,573,869	3,068,421	395,054	394,089
Develop and Report Plan to Achieve GHG Targets .....	147,435	191,552	22,629	24,602
Section 490.511—Calculation of System Performance Metrics .....	1,752,927	2,094,857	269,051	269,051
Calculate Annual Total Tailpipe CO <sub>2</sub> Emissions .....	1,752,927	2,094,857	269,051	269,051
Section 490.513—Calculation of System Performance Measures .....	48,703	58,061	7,475	7,457
Calculate % Change in Tailpipe CO <sub>2</sub> Emissions the NHS Compared to the Calendar Year 2017 Level .....	48,703	58,061	7,475	7,457
Total Cost of Final Rule .....	10,891,892	12,805,709	1,671,758	1,644,687

\* Results presented in 2014 dollars for consistency with GHG Repeal NPRM RIA.

The effects potentially caused by the national GHG performance measure established in the PM3 Final Rule were administrative activities (such as holding meetings and the use of energy to operate offices) that State DOTs and MPOs would undertake to establish targets, calculate their progress toward their selected targets, report to FHWA, and determine a plan of action to make progress toward their selected targets if they failed to make significant progress during a performance period.<sup>101</sup> Those effects serve as the baseline in this analysis. It is foreseeable that the decision to repeal the GHG measure in this rulemaking will cause (1) State DOTs and MPOs that have not yet set a CO<sub>2</sub> emissions target to terminate their 23 U.S.C. 150(d) target-setting activities for the GHG measure; and (2) State DOTs and MPOs that have selected a CO<sub>2</sub> emissions target to terminate activities related to tracking their performance and progress towards a 23 U.S.C. 150(d) CO<sub>2</sub> emissions target. The repeal also will relieve State DOTs and MPOs of all future obligations with respect to this national CO<sub>2</sub> emissions measure, including the obligation to calculate and report on their progress and to identify an action plan if they do not make significant progress toward

their CO<sub>2</sub> emissions target. The effects will be to reduce or eliminate the administrative activities associated with implementing the GHG measure.

This action complies with the principles of E.O. 13563. After evaluating the costs and benefits of the rule, FHWA believes that the cost savings from this rulemaking would exceed the forgone benefits. These changes are not anticipated to adversely affect, in any material way, any sector of the economy. In addition, these changes will not create a serious inconsistency with any other agency's action or materially alter the budgetary impact of any entitlements, grants, user fees, or loan programs.

#### B. Regulatory Flexibility Act

In compliance with the Regulatory Flexibility Act (Pub. L. 96–354, 5 U.S.C. 601–612), FHWA has evaluated the effects of this action on small entities and has determined that the action would not have a significant economic impact on a substantial number of small entities. The rule addresses the obligation of Federal funds to State DOTs for Federal-aid highway projects. The rule affects two types of entities: State governments and MPOs. State governments do not meet the definition of a small entity under 5 U.S.C. 601,

which have a population of less than 50,000.

The MPOs are considered governmental jurisdictions, and to qualify as a small entity they would need to serve less than 50,000 people. The MPOs serve urbanized areas with populations of 50,000 or more. As discussed in the RIA, the rule is expected to impose costs on MPOs that serve populations exceeding 200,000. Therefore, the MPOs that incur economic impacts under this rule do not meet the definition of a small entity.

We hereby certify that this regulatory action would not have a significant economic impact on a substantial number of small entities.

#### C. Unfunded Mandates Reform Act of 1995

FHWA has determined that this action does not impose unfunded mandates as defined by the Unfunded Mandates Reform Act of 1995 (Pub. L. 104–4, March 22, 1995, 109 Stat. 48). This rule does not include a Federal mandate that may result in expenditures of \$151 million or more in any 1 year (when adjusted for inflation) in 2012 dollars for either State, local, and tribal governments in the aggregate, or by the private sector. In addition, the definition of “Federal mandate” in the Unfunded Mandates Reform Act

<sup>101</sup> 23 CFR 490.109.



excludes financial assistance of the type in which State, local, or tribal governments have authority to adjust their participation in the program in accordance with changes made in the program by the Federal Government. The FAHP permits this type of flexibility.

*D. Executive Order 13132 (Federalism Assessment)*

FHWA has analyzed this action in accordance with the principles and criteria contained in E.O. 13132. FHWA has determined that this action does not have sufficient federalism implications to warrant the preparation of a federalism assessment. FHWA has also determined that this action does not preempt any State law or State regulation or affect the States' ability to discharge traditional State governmental functions.

*E. Executive Order 12372 (Intergovernmental Review)*

The regulations implementing E.O. 12372 regarding intergovernmental consultation on Federal programs and activities apply to this program. Local entities should refer to the Catalog of Federal Domestic Assistance Program Number 20.205, Highway Planning and Construction, for further information.

*F. Paperwork Reduction Act*

Under the PRA (44 U.S.C. 3501, *et seq.*), Federal agencies must obtain approval from the OMB for each collection of information they conduct, sponsor, or require through regulations. FHWA has analyzed this action under the PRA and has determined that this rulemaking would reduce PRA burdens associated with this measure.

*G. National Environmental Policy Act*

FHWA has analyzed this action for the purpose of NEPA, as amended (42 U.S.C. 4321 *et seq.*), and has determined that this action would not have any significant effect on the quality of the environment and meets the criteria for the categorical exclusion at 23 CFR 771.117(c)(20).<sup>102</sup>

The nature and potential effects of the GHG measure are described in detail in Section V.F.5. of this document. With respect to this rulemaking, changes in CO<sub>2</sub> emissions are not a direct or indirect effect of the repeal of the GHG measure because there is no reasonably close causal connection between the repeal and actions taken by the State DOTs and MPOs to change CO<sub>2</sub>

emissions levels. Any potential change in CO<sub>2</sub> emissions levels associated with the NHS would be the result of independent actions taken (or not taken) by State DOTs and MPOs. These intervening State DOT and MPO actions are not reasonably foreseeable effects<sup>103</sup> of the GHG measure because the measure does not require those entities to take steps to reduce CO<sub>2</sub> emissions, and the GHG measure does not prescribe any method for State DOTs and MPOs to take such steps. The absence of a sufficiently close causal connection, and reasonable foreseeability, also means that NEPA does not require FHWA to consider CO<sub>2</sub> emissions effects as a cumulative impact.

FHWA's conclusion that the GHG measure would not be a legal cause of changes in CO<sub>2</sub> emissions levels, and thus would not produce effects that NEPA requires FHWA to analyze in this rulemaking, is further supported by Clean Air Act regulations promulgated by the EPA. In 40 CFR 93.152, EPA adopted a "but for" approach, defining direct and indirect emissions caused by a Federal action as emissions that would not otherwise occur in the absence of Federal action. As described above, a decision to leave the GHG measure in effect would not result in the reduction of CO<sub>2</sub> emissions. For the same reasons, the decision to repeal the measure does not result in an increase in CO<sub>2</sub> emissions.

Pursuant to 23 CFR 771.117(c)(20), this repeal qualifies as categorically excluded from preparation of an EIS or environmental assessment under NEPA. FHWA concluded that the repeal of the GHG measure will not involve reasonably foreseeable significant environmental impacts. The GHG measure imposed no limits or controls on CO<sub>2</sub> emissions, had no legal power to force changes in CO<sub>2</sub> emissions, and left target-setting entirely to the discretion of State DOTs and MPOs. The repeal of the GHG measure is not a legally relevant cause of any change, or lack of change, in CO<sub>2</sub> emissions levels or the direct, indirect, or cumulative impacts potentially related to those emissions. This is true regardless of the geographic impact area considered. With respect to other types of potential environmental impacts from the repeal of the GHG measure, they are minor and consistent with the type of impacts related to administrative activities, such as analyzing data and reporting on the

results (*e.g.*, use of energy to operate computers, telephones, and office space). Such activities fit squarely within the boundaries of 23 CFR 771.117(c)(20).

In making the determination that the repeal of the GHG measure qualifies for a categorical exclusion, FHWA considered whether the proposed regulatory action involves unusual circumstances. 23 CFR 771.117(b). Given FHWA's determination that the GHG measure is not reasonably causally connected to CO<sub>2</sub> emissions levels, the analysis of unusual circumstances in this instance focuses on whether there are unusual circumstances relating to other types of potential environmental effects. FHWA found none of the environmental impacts from implementing, not implementing, or ceasing current implementation of the GHG measure rose to the level of significance under NEPA (23 CFR 771.117(b)(1)). FHWA found no substantial controversy exists over the size, nature, or effect of potential environmental impacts from the States DOTs and MPOs not carrying out the administrative activities associated with CO<sub>2</sub> emissions target-setting or reporting on their performance with regard to those targets (23 CFR 771.117(b)(2)). There are no anticipated impacts from those administrative activities, or lack thereof, on properties protected by the NHPA or section 4(f) (23 U.S.C. 138) (23 CFR 771.117(b)(3)). Finally, FHWA found no inconsistencies with other laws, requirements, or determinations within the meaning of 23 CFR 771.117(b)(4).

*H. Executive Order 12630 (Taking of Private Property)*

FHWA has analyzed this action under E.O. 12630, Governmental Actions and Interference with Constitutionally Protected Property Rights. FHWA does not anticipate that this action would affect a taking of private property or otherwise have taking implications under E.O. 12630.

*I. Executive Order 12988 (Civil Justice Reform)*

This action meets applicable standards in sections 3(a) and 3(b)(2) of E.O. 12988, Civil Justice Reform, to minimize litigation, eliminate ambiguity, and reduce burden.

*J. Executive Order 13045 (Protection of Children)*

We have analyzed this rule under E.O. 13045, Protection of Children from Environmental Health Risks and Safety Risks. FHWA certifies that this action would not cause an environmental risk

<sup>102</sup> This rulemaking also qualifies for a categorical exclusion under 23 CFR 771.117(c)(1) (activities which do not involve or lead directly to construction).

<sup>103</sup> Courts have interpreted "reasonably foreseeable" as meaning that the likelihood that the effects will occur is high enough that a person of "ordinary prudence" would consider the effects when making decisions.

to health or safety that might disproportionately affect children.

*K. Executive Order 13175 (Tribal Consultation)*

FHWA has analyzed this action under E.O. 13175, dated November 6, 2000, and believes that the action would not have substantial direct effects on one or more Indian tribes; would not impose substantial direct compliance costs on Indian tribal governments; and would not preempt tribal laws. The rulemaking addresses obligations of Federal funds to State DOTs for Federal-aid highway projects and would not impose any direct compliance requirements on Indian tribal governments. Therefore, a tribal summary impact statement is not required.

*L. Regulation Identifier Number*

A RIN is assigned to each regulatory action listed in the Unified Agenda of Federal Regulations. The Regulatory Information Service Center publishes the Unified Agenda in April and October of each year. The RIN number contained in the heading of this document can be used to cross-reference this action with the Unified Agenda.

**List of Subjects in 23 CFR Part 490**

Bridges, Highway safety, Highways and roads, Reporting and recordkeeping requirements.

Issued in Washington, DC, on May 21, 2018 under authority delegated in 49 CFR 1.85:

**Brandye L. Hendrickson,**  
*Acting Administrator, Federal Highway Administration.*

In consideration of the foregoing, FHWA amends 23 CFR part 490 as follows:

**PART 490—NATIONAL PERFORMANCE MANAGEMENT MEASURES**

■ 1. The authority citation for part 490 continues to read as follows:

**Authority:** 23 U.S.C. 134, 135, 148(i), and 150; 49 CFR 1.85.

**Subpart A—General Information**

**§ 490.105 [Amended]**

■ 2. Amend § 490.105 by removing and reserving paragraphs (c)(5) and (d)(1)(v).

**§ 490.107 [Amended]**

■ 3. Amend § 490.107 by removing and reserving paragraphs (b)(1)(ii)(H), (b)(2)(ii)(J), (b)(3)(ii)(I), and (c)(4).

■ 4. Amend § 490.109 by removing and reserving paragraphs (d)(1)(v) and (f)(1)(v) and revising paragraph (d)(1)(vi) to read as follows:

**§ 490.109 Assessing significant progress toward achieving the performance targets for the National Highway Performance Program and the National Highway Freight Program.**

\* \* \* \* \*

(d) \* \* \*

(1) \* \* \*

(vi) Baseline condition/performance data contained in HPMS and NBI of the year in which the Baseline Period Performance Report is due to FHWA that represents baseline conditions/performances for the performance period for the measures in § 490.105(c)(1) through (4).

\* \* \* \* \*

**Subpart E—National Performance Management Measures to Assess Performance of the National Highway System**

**§ 490.503 [Amended]**

■ 5. Amend § 490.503 by removing and reserving paragraph (a)(2).

**§ 490.505 [Amended]**

■ 6. Amend § 490.505 by removing the definition for “Greenhouse gas (GHG).”

**§ 490.507 [Amended]**

■ 7. Amend § 490.507 as follows:

■ a. By removing the word “three” and adding in its place “two” in the introductory text; and

■ b. By removing and reserving paragraph (b).

**§ 490.509 [Amended]**

■ 8. Amend § 490.509 by removing paragraphs (f)–(h).

**§ 490.511 [Amended]**

■ 9. Amend § 490.511 by removing and reserving paragraphs (a)(2), (c), (d), and (f).

**§ 490.513 [Amended]**

■ 10. Amend § 490.513 by removing paragraph (d).

[FR Doc. 2018–11652 Filed 5–30–18; 8:45 am]

**BILLING CODE 4910–22–P**

**DEPARTMENT OF HOMELAND SECURITY**

**Coast Guard**

**33 CFR Part 117**

**[Docket No. USCG–2018–0301]**

**Drawbridge Operation Regulation; Columbia River, Portland, OR and Vancouver, WA**

**AGENCY:** Coast Guard, DHS.

**ACTION:** Notice of deviation from drawbridge regulation.

**SUMMARY:** The Coast Guard has issued a temporary deviation from the operating schedule that governs the Interstate 5 (I–5) Bridges across the Columbia River, mile 106.5, between Portland, OR, and Vancouver, WA. The deviation is necessary to facilitate the movement of heavier than normal roadway traffic associated with the Independence Day fireworks show near the I–5 Bridges. This deviation allows the bridges to remain in the closed-to-navigation position during the event.

**DATES:** This deviation is effective from 9 p.m. to 11:59 p.m. on July 4, 2018.

**ADDRESSES:** The docket for this deviation, USCG–2018–0301 is available at <http://www.regulations.gov>. Type the docket number in the “SEARCH” box and click “SEARCH.” Click on Open Docket Folder on the line associated with this deviation.

**FOR FURTHER INFORMATION CONTACT:** If you have questions on this temporary deviation, call or email Mr. Steven Fischer, Bridge Administrator, Thirteenth Coast Guard District; telephone 206–220–7282, email [d13-pf-d13bridges@uscg.mil](mailto:d13-pf-d13bridges@uscg.mil).

**SUPPLEMENTARY INFORMATION:** Oregon Department of Transportation, the bridge owner, requested a temporary deviation from the operating schedule for the I–5 Bridges, mile 106.5, across the Columbia River between Vancouver, WA, and Portland, OR, to facilitate safe passage of participants in the Independence Day fireworks show event. The I–5 Bridges provides three designated navigation channels with vertical clearances ranging from 39 to 72 feet above Columbia River Datum 0.0 while the lift spans are in the closed-to-navigation position. The I–5 Bridges operate in accordance with 33 CFR 117.869(a). The subject bridges need not open to marine vessels during the deviation period from 9 p.m. to 11:59 p.m. on July 4, 2018. The bridges shall operate in accordance with 33 CFR 117.869(a) at all other times. Waterway usage on this part of the Columbia River includes vessels ranging from large commercial ships, tug and tow vessels to recreational pleasure craft.

Vessels able to pass under the bridges in the closed-to-navigation positions may do so at any time. The bridges will be able to open for emergencies, and this part of the Columbia River has no alternate route for vessels to pass. The Coast Guard will also inform the users of the waterways through our Local and Broadcast Notices to Mariners of the change in operating schedule for the

**§ 490.411 Establishment of minimum level for condition for bridges.**

(a) State DOTs will maintain bridges so that the percentage of the deck area of bridges classified as Structurally Deficient does not exceed 10.0 percent. This minimum condition level is applicable to bridges carrying the NHS, which includes on- and off-ramps connected to the NHS within a State, and bridges carrying the NHS that cross a State border.

(b) For the purposes of carrying out this section and § 490.413, a bridge will

be classified as Structurally Deficient when one of its NBI Items, 58—Deck, 59—Superstructure, 60—Substructure, or 62—Culverts, is 4 or less, or when one of its NBI Items, 67—Structural Evaluation or 71—Waterway Adequacy, is 2 or less. Beginning with calendar year 2018 and thereafter, a bridge will be classified as Structurally Deficient when one of its NBI Items, 58—Deck, 59—Superstructure, 60—Substructure, or 62—Culverts, is 4 or less.

(c) For all bridges carrying the NHS, which includes on- and off-ramps connected to the NHS and bridges carrying the NHS that cross a State border, FHWA shall calculate a ratio of the total deck area of all bridges classified as Structurally Deficient to the total deck area of all applicable bridges for each State. The percentage of deck area of bridges classified as Structurally Deficient shall be computed by FHWA to the one tenth of a percent as follows:

$$100 \times \frac{\sum_{SD=1}^{\text{Structurally Deficient}} [\text{Length} \times \text{Width}]_{\text{Bridge SD}}}{\sum_{s=1}^{\text{TOTAL}} [\text{Length} \times \text{Width}]_{\text{Bridge s}}}$$

Where:

Structurally Deficient = total number of the applicable bridges, where their classification is Structurally Deficient per this section and § 490.413;

SD = a bridge classified as Structurally Deficient per this section and § 490.413;

Length = corresponding value of NBI Item 49—Structure Length for every applicable bridge;

Width = corresponding value of NBI Item 52—Deck Width

Beginning with calendar year 2018 and thereafter, Width = corresponding value of NBI Item 52—Deck Width or value of Item 32 Approach Roadway Width for culverts where the roadway is on a fill [i.e., traffic does not directly run on the top slab (or wearing surface) of the culvert] and the headwalls do not affect the flow of traffic for every applicable bridge.

s = an applicable bridge per this section and § 490.413; and

TOTAL = total number of the applicable bridges specified in this section and § 490.413.

(d) The FHWA will annually determine the percentage of the deck area of NHS bridges classified as Structurally Deficient for each State DOT and identify State DOTs that do not meet the minimum level of condition for NHS bridges based on data cleared in the NBI as of June 15 of each year. The FHWA will notify State DOTs of their compliance with 23 U.S.C. 119(f)(2) prior to October 1 of the year in which the determination was made.

(e) For the purposes of carrying out this section, State DOTs will annually submit their most current NBI data on highway bridges to FHWA no later than March 15 of each year.

(f) The NBI Items included in this section are found in the Recording and Coding Guide for the Structure Inventory and Appraisal of the Nation's Bridges, which is incorporated by reference (see § 490.111).

**§ 490.413 Penalties for not maintaining bridge condition.**

(a) If FHWA determines for the 3-year period preceding the date of the determination, that more than 10.0 percent of the total deck area of bridges in the State on the NHS is located on bridges that have been classified as Structurally Deficient, the following requirements will apply.

(1) During the fiscal year following the determination, the State DOT shall obligate and set aside in an amount equal to 50 percent of funds apportioned to such State for fiscal year 2009 to carry out 23 U.S.C. 144 (as in effect the day before enactment of MAP-21) from amounts apportioned to a State for a fiscal year under 23 U.S.C. 104(b)(1) only for eligible projects on bridges on the NHS.

(2) The set-aside and obligation requirement for bridges on the NHS in a State in paragraph (a) of this section for a fiscal year shall remain in effect for each subsequent fiscal year until such time as less than 10 percent of the total deck area of bridges in the State on the NHS is located on bridges that have been classified as Structurally Deficient as determined by FHWA.

(b) The FHWA will make the first determination by October 1, 2016, and each fiscal year thereafter.

[FR Doc. 2017-00550 Filed 1-12-17; 4:15 pm]

**BILLING CODE 4910-22-P**

**DEPARTMENT OF TRANSPORTATION**

**Federal Highway Administration**

**23 CFR Part 490**

[Docket No. FHWA-2013-0054]

RIN 2125-AF54

**National Performance Management Measures; Assessing Performance of the National Highway System, Freight Movement on the Interstate System, and Congestion Mitigation and Air Quality Improvement Program**

**AGENCY:** Federal Highway Administration (FHWA), Department of Transportation (DOT).

**ACTION:** Final rule.

**SUMMARY:** This final rule is the third and last in a series of three related rulemakings that together establishes a set of performance measures for State departments of transportation (State DOT) and Metropolitan Planning Organizations (MPO) to use as required by the Moving Ahead for Progress in the 21st Century Act (MAP-21) and the Fixing America's Surface Transportation (FAST) Act. The measures in this third final rule will be used by State DOTs and MPOs to assess the performance of the Interstate and non-Interstate National Highway System (NHS) for the purpose of carrying out the National Highway Performance Program (NHPP); to assess freight movement on the Interstate System; and to assess traffic congestion and on-road mobile source emissions for the purpose of carrying out the Congestion Mitigation and Air Quality Improvement (CMAQ) Program. This third performance measure final rule also includes a discussion that summarizes all three of the national performance management measures



rules and the comprehensive regulatory impact analysis (RIA) to include all three final rules.

**DATES:** This final rule is February 17, 2017.

**FOR FURTHER INFORMATION CONTACT:** For technical information: Francine Shaw Whitson, Office of Infrastructure, (202) 366–8028; for legal information: Alla Shaw, Office of Chief Counsel, (202) 366–0740, Federal Highway Administration, 1200 New Jersey Avenue SE., Washington, DC 20590. Office hours are from 8 a.m. to 4:30 p.m. ET, Monday through Friday, except Federal holidays.

**SUPPLEMENTARY INFORMATION:**

**Electronic Access and Filing**

The notice of proposed rulemaking (NPRM) was published at 81 FR 23806 on April 22, 2016. A copy of the NPRM, all comments received, and all background material may be viewed online at <http://www.regulations.gov>. Electronic retrieval help and guidelines are available on the Web site. It is available 24 hours each day, 365 days each year. An electronic copy of this document may also be downloaded from the Office of the Federal Register's Web site at <http://www.ofr.gov> and the Government Publishing Office's Web site at <http://www.gpo.gov>.

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**I. Executive Summary**

*A. Purpose of the Regulatory Action*

The MAP–21 (Pub. L. 112–141) transforms the Federal-aid highway program by establishing new requirements for performance management to ensure the most efficient investment of Federal transportation funds. Performance management increases the accountability and transparency of the Federal-aid highway program and provides a framework to

support improved investment decisionmaking through a focus on performance outcomes for key national transportation goals.

As part of performance management, recipients of Federal-aid highway funds will make transportation investments to achieve performance targets that make progress toward the following national goals:

- **Safety**—To achieve a significant reduction in traffic fatalities and serious injuries on all public roads.
- **Infrastructure condition**—To maintain the highway infrastructure asset system in a state of good repair.
- **Congestion reduction**—To achieve a significant reduction in congestion on the NHS.
- **System reliability**—To improve the efficiency of the surface transportation system.

- **Freight movement and economic vitality**—To improve the national freight network, strengthen the ability of rural communities to access national and international trade markets, and support regional economic development.

- **Environmental sustainability**—To enhance the performance of the transportation system while protecting and enhancing the natural environment.

- **Reduced project delivery delays**—To reduce project costs, promote jobs and the economy, and expedite the movement of people and goods by accelerating project completion through eliminating delays in the project development and delivery process, including reducing regulatory burdens and improving agencies' work practices.

The purpose of this final rule is to implement MAP-21 and FAST Act (PL 114-94) performance management requirements. Prior to MAP-21, there were no explicit requirements for State DOTs to demonstrate how their transportation program supported national performance outcomes. State DOTs were not required to measure condition or performance, establish targets, assess progress toward targets, or report on condition or performance in a nationally consistent manner that FHWA could use to assess the entire system. Without States reporting on the above factors, it is difficult for FHWA to examine the effectiveness of the Federal-aid highway program as a means to address surface transportation performance at a national level.

This final rule is one of several rulemakings to implement MAP-21's new performance management framework. The collective rulemakings will establish the regulations needed to more effectively evaluate and report on surface transportation performance across the Nation. This final rule will:

- Provide for greater consistency in the reporting of condition and performance;

- Establish specific national performance measures to be used to assess performance of the NHS, freight movement on the Interstate and CMAQ traffic congestion and on-road mobile source emissions;

- Require the establishment of targets that can be aggregated at the national level;

- Improve transparency by requiring consistent reporting on progress through a public reporting system;

- Require State DOTs to make significant progress toward meeting their targets; and

- Establish requirements for State DOTs that have not met or made significant progress toward achieving their NHPP and NHFP targets.

State DOTs and MPOs will be expected to use the information and data generated as a result of the new regulations to inform their transportation planning and programming decisions. The new performance aspects of the Federal-aid highway program that result from this rule will provide FHWA the ability to better communicate a national performance story and to assess the impacts of Federal funding investments more reliably. The FHWA is in the process of creating a new public Web site to help communicate the national performance story and display State DOT performance reports. The Web site will likely include infographics, tables, charts, and descriptions of the performance data that State DOTs will be reporting to FHWA.

The FHWA is required to establish performance measures to assess performance in 12 areas<sup>1</sup> generalized as follows: (1) Serious injuries per vehicle miles traveled (VMT); (2) fatalities per VMT; (3) number of serious injuries; (4) number of fatalities; (5) pavement condition on the Interstate System; (6) pavement condition on the non-Interstate NHS; (7) bridge condition on the NHS; (8) performance of the Interstate System; (9) performance of the non-Interstate NHS; (10) freight movement on the Interstate System; (11) traffic congestion; and (12) on-road mobile source emissions. This rulemaking is the third of three that establish performance measures for State DOTs and MPOs to use to carry out Federal-aid highway programs and to assess performance in each of these 12 areas. This final rule establishes

<sup>1</sup> These areas are listed within 23 U.S.C. 150(c), which requires the Secretary to establish measures to assess performance or condition.

national performance measures for the NHPP, freight movement, and the CMAQ program (numbers 8 through 12 in the above list). See Table 1 for a summary of all measures.

The final measures in this rule have been adjusted in response to comments, and those changes are summarized in Section I.B of the Executive Summary. Details about data requirements and calculation methodologies for each measure can be found in Section VI.

Three measures are established for assessing the performance of the NHS under the NHPP. Two measures assess reliability: (1) Percent of Person-Miles Traveled on the Interstate System That Are Reliable (the Interstate Travel Time Reliability measure); and (2) Percent of Person-Miles Traveled on the Non-Interstate NHS That Are Reliable (the Non-Interstate NHS Travel Time Reliability measure). Together they are the Travel Time Reliability measures. Both of these measures assess Level of Travel Time Reliability (LOTTR), defined as the ratio of the 80th percentile travel time to a "normal" travel time (50th percentile). Data are derived from the travel time data set using either the National Performance Management Research Data Set (NPMRDS) or equivalent. A third measure, Percent Change in Tailpipe CO<sub>2</sub> Emissions on the NHS from the Calendar Year 2017, assesses environmental performance. This measure is calculated using data on fuel use and VMT.

The performance measure to assess freight movement on the Interstate is Percentage of the Interstate System Mileage providing for Reliable Truck Travel Times, or Truck Travel Time Reliability (TTTR) Index (the Freight Reliability measure). The measure also uses the Travel Time Data Set of NPRMDS, but unlike the LOTTR which uses a threshold to determine reliability, TTTR Index is expressed as an average for the entire applicable area.

Three measures are established under the CMAQ program (the CMAQ measures) including two measures for traffic congestion: (1) Annual Hours of Peak-Hour Excessive Delay Per Capita (the PHED measure); and (2) Percent of Non-SOV Travel where SOV stands for single-occupancy vehicle. Data for these two measures are derived from the travel time data set of NPMRDS. The second measure is a new measure developed to recognize the role of lower-emissions modes in meeting air quality goals. State DOTs and MPOs have three options for providing data for this measure.

The third measure under the CMAQ program is Total Emissions Reduction.

This measure uses data from the CMAQ Public Access System to calculate total emission reductions for applicable criteria pollutants or precursors. A summary of all the national performance management measures rulemakings are listed in Table 1 below.

TABLE 1—SUMMARY OF RULEMAKINGS TO IMPLEMENT THE NATIONAL PERFORMANCE MANAGEMENT MEASURE RULES

Rulemaking	23 CFR part 490 section	Final performance measures	Measure applicability
Safety PM Final Rule.	490.207(a)(1) .....	Number of fatalities .....	All public roads.
	490.207(a)(2)	Rate of fatalities .....	All public roads.
	490.207(a)(3)	Number of serious injuries .....	All public roads.
	490.207(a)(4)	Rate of serious injuries .....	All public roads.
	490.207(a)(5)	Number of non-motorized fatalities and non-motorized serious injuries.	All public roads.
Infrastructure PM Final Rule	490.307(a)(1) .....	Percentage of pavements of the Interstate System in Good condition.	The Interstate System.
	490.307(a)(2)	Percentage of pavements of the Interstate System in in Poor condition.	The Interstate System.
	490.307(a)(3)	Percentage of pavements of the non-Interstate NHS in Good condition.	The non-Interstate NHS.
	490.307(a)(4)	Percentage of pavements of the non-Interstate NHS in Poor condition.	The non-Interstate NHS.
	490.407(c)(1)	Percentage of NHS bridges classified as in Good condition	NHS.
System Performance PM Final Rule.	490.407(c)(2)	Percentage of NHS bridges classified as in Poor condition ..	NHS.
	490.507(a)(1) .....	Percent of the Person-Miles Traveled on the Interstate That Are Reliable.	The Interstate System.
	490.507(a)(2)	Percent of the Person-Miles Traveled on the Non-Interstate NHS That Are Reliable.	The non-Interstate NHS.
	490.507(b)	Percent Change in Tailpipe CO <sub>2</sub> Emissions on the NHS Compared to the Calendar Year 2017 Level.	NHS.
	490.607	Truck Travel Time Reliability (TTTR) Index .....	The Interstate System.
	490.707(a)	Annual Hours of Peak Hour Excessive Delay Per Capita .....	The NHS in urbanized areas with a population over 1 million for the first performance period and in urbanized areas with a population over 200,000 for the second and all other performance periods that are also in nonattainment or maintenance areas for ozone (O <sub>3</sub> ), carbon monoxide (CO), or particulate matter (PM <sub>10</sub> and PM <sub>2.5</sub> ).
	490.707(b)	Percent of Non-SOV Travel.	
	490.807	Total Emissions Reduction .....	All projects financed with funds from the 23 U.S.C. 149 CMAQ program apportioned to State DOTs in areas designated as non-attainment or maintenance for ozone (O <sub>3</sub> ), carbon monoxide (CO), or particulate matter (PM <sub>10</sub> and PM <sub>2.5</sub> ).

In addition, this final rule establishes the process for State DOTs and MPOs to establish and report targets and the process that FHWA will use to assess the progress State DOTs have made in achieving targets. State DOTs will be required to establish performance targets and assess performance in the above mentioned 12 areas established by MAP-21, and FHWA will assess<sup>2</sup> their progress toward meeting targets in

10 of these areas<sup>3</sup> in accordance with MAP-21 and the FAST Act. State DOTs that fail to meet or make significant progress toward targets in a biennial performance reporting period will be required to document the actions they will undertake to achieve their targets in

<sup>3</sup> Serious injuries per vehicle VMT; fatalities per VMT; number of serious injuries; number of fatalities; pavement condition on the Interstate System; pavement condition on the non-Interstate NHS; bridge condition on the NHS; performance of the Interstate System; performance of the non-Interstate NHS under MAP-21; and freight movement on the Interstate System under the FAST Act.

their next biennial performance report. Failure to make progress in the safety metrics requires additional actions as outlined in the published Safety final rule.

The FHWA received extensive and substantive comments on the NPRM. The FHWA made significant alterations to the measures in response to these comments, and a summary of major issues raised can be found at the beginning of Section V, with detailed responses following. The FHWA also recognizes that data collection and analytic capacity are not yet developed

<sup>2</sup> 23 U.S.C. 148(i) and 23 U.S.C. 119(e)(7).



enough to respond effectively to many commenters' suggestions, particularly in measuring multimodal performance. Therefore, FHWA is working to develop more sophisticated performance metrics and may issue an updated rulemaking on performance measures related to person throughput and multi-modal performance in the future, following completion of ongoing research regarding multimodal system performance measures in Fall 2018.

Lastly, FHWA recognizes that implementation of the performance management requirements in this final rule will evolve with time for a variety of reasons such as: The introduction of new technologies that allow for the collection of more nationally consistent and/or reliable performance data; shifts in national priorities for the focus of a goal area; new federal requirements; or the emergence of improved approaches to measure condition/performance in supporting investment decisions and national goals. The FHWA is committed to performing a retrospective review of this rule after the first performance period, to assess the effectiveness of the requirements to identify any necessary changes to better support investment decisions through performance-based planning and programming and to ensure the most efficient investment of Federal transportation funds. In implementation of this rule, FHWA realizes that there are multiple ways that State DOTs and MPOs can make decisions to achieve more efficient and cost effective investments; as part of a retrospective review, FHWA will also utilize implementation surveys to identify how agencies complying with

the rule are developing their programs and selecting their projects to achieve targets.

#### B. Summary of the Major Changes Made to the Regulatory Action in Question

This final rule retains the majority of the major provisions of the NPRM, but it makes the following significant changes.

- Removing the proposed NHFP measure for percentage of the Interstate congested.
- Merging the proposed peak-hour travel time measure under NHPP with the proposed excessive delay measure under CMAQ Traffic Congestion into one measure under CMAQ, the PHED measure. This new measure focuses on excessive delay experienced during peak hours in applicable urbanized areas.
- Introducing two new measures in response to extensive public comments:
  - Under NHPP System Performance—a new measure to assess system performance, specifically the percent change in CO<sub>2</sub> emissions from the reference year 2017, generated by on-road mobile sources on the NHS (the GHG measure). All State DOTs and MPOs that have NHS mileage in their State geographic boundaries and metropolitan planning areas, respectively, will be required to establish targets and report on progress. The FHWA will assess every 2 years to determine if a State DOT has made significant progress toward achieving their targets.
  - Under CMAQ Traffic Congestion—a new measure to assess modal share, specifically the Percent of Non-SOV

Travel measure. State DOTs and MPOs are provided the opportunity to use localized surveys or measurements to report on this measure and will be encouraged to report to FHWA any data not currently available in national sources (e.g., bike counts).

- Changing the weighting of the travel time measures from system miles to person-miles traveled, focusing on bus, auto, and truck occupancy levels, and providing opportunities for State DOTs and MPOs to capture more specific local occupancy levels for particular corridors or areas.

- These changes result in one fewer measure than proposed in the NPRM, for a total of 7 measures. Now, four of these are derived from vehicle travel times, three of which reflect all people traveling on the system, a change requested by many commenters.

- Phasing in expanded applicability of the CMAQ Traffic Congestion measures beginning with urbanized areas with a population over 1 million in the first performance period and expanding to urbanized areas with a population over 200,000 beginning in the second performance period. These measures are to carry out the CMAQ program; therefore, the areas will be limited to urbanized areas that contain any part of nonattainment or maintenance areas for one or more pollutants listed in 23 U.S.C. 149 (ozone, carbon monoxide, or particulate matter).

- Taking steps to simplify and otherwise respond to suggestions regarding the data processing and calculation of the measures.

TABLE 2—SUMMARY OF FINAL MEASURES IN THE THIRD PERFORMANCE MEASURE FINAL RULE

Measure groups (program area)	Performance measures	Measure/target applicability	Metric data source & collection frequency	Metric
NHPP .....	Percent of Person-Miles Traveled on the Interstate That Are Reliable. Percent of Person-Miles Traveled on the Non-Interstate NHS That Are Reliable. Percent Change in CO <sub>2</sub> Emissions on the NHS Compared to the Calendar Year 2017 Level.	Mainline of the Interstate System within a State or each metropolitan planning area. Mainline of the non-Interstate NHS within a State or each metropolitan planning area. NHS within a State or each metropolitan planning area.	All traffic/vehicles data in NPMRDS or Equivalent—every 15-minutes. All traffic/vehicles data in NPMRDS or Equivalent—every 15-minutes. Annual state total fuel sales data from Highway Statistics and VMT estimates on NHS and all public roads from HPMS.	Level of Travel Time Reliability (LOTTR). Level of Travel Time Reliability (LOTTR). Annual Total Tailpipe CO <sub>2</sub> Emissions on the NHS.
Freight movement on the Interstate System measure (NHFP).	Truck Travel Time Reliability (TTTR) Index.	Mainline of the Interstate System within a State or each metropolitan planning area.	Truck data in NPMRDS or equivalent data set—every 15—minutes.	TTTR Index.

TABLE 2—SUMMARY OF FINAL MEASURES IN THE THIRD PERFORMANCE MEASURE FINAL RULE—Continued

Measure groups (program area)	Performance measures	Measure/target applicability	Metric data source & collection frequency	Metric
CMAQ .....	Annual Hours of Peak-Hour Excessive Delay Per Capita.	Mainline of NHS in urbanized areas with a population over 1M/200k in nonattainment or maintenance for any of the criteria pollutants under the CMAQ program.	All traffic/vehicles data in NPMRDS or equivalent data set—every 15 minutes (bus, car and truck volumes in HPMS; occupancy factors published by FHWA. ACS, local survey, or local counts (includes bike/pedestrian counts).	Total Peak-Hour Excessive Delay person-hours.
	Percent of N SOV Travel.	Urbanized areas with a population over 1M/200k in nonattainment or maintenance for any of the criteria pollutants under the CMAQ program.		n/a.
	Total Emission Reductions.	All nonattainment and maintenance areas for CMAQ criteria pollutants.	CMAQ Public Access System	n/a.

The FHWA updated these and other elements in this final rule based on the review and analysis of comments received. For additional detail on all the changes FHWA made in the final rule, please refer to Sections V and VI of this document. The FHWA has also prepared a comment response document available on the docket for this rulemaking. The following summarizes the regulatory impact analysis for the final rule. Section references below refer to sections of the regulatory text for title 23 of the Code of Federal Regulations (23 CFR).

This final rule adds to subpart A, general information applicable to part 490, to include requirements for target establishment, reporting on progress, and how determinations would be made on whether State DOTs have made significant progress toward NHPP targets. Subpart A also includes definitions and clarifies terminology associated with target establishment, reporting, and making significant progress. Section 490.105 describes the process State DOTs and MPOs must use to establish targets. State DOTs will establish their first statewide targets 1 year after the effective date of this rule. The MPOs have up to 180 days after State DOTs establish their targets to establish their own targets. The FHWA has placed a timeline on the docket that illustrates how this transition could be implemented.

#### C. Costs and Benefits

The FHWA estimated the incremental costs associated with the new requirements that represent a change to current practices of USDOT, State DOTs, and MPOs.<sup>4</sup> The FHWA derived the costs of the new requirements by

assessing the additional capital needed and the expected increase in the level of labor effort for FHWA, State DOTs, and MPOs to standardize and update data collection and reporting systems, and establish and report targets.

The FHWA sought opinions from subject matter experts (SMEs) on NHS performance, freight movement, and traffic congestion and emissions to estimate impacts of the final rule. Cost estimates were developed based on information received from SMEs.

To estimate costs, FHWA multiplied the level of effort, expressed in labor hours, with a corresponding loaded wage rate that varied by the type of laborer needed to perform the activity.<sup>5</sup> Where necessary, capital costs were also included. Many of these measures rely on the use and availability of NPMRDS data provided by FHWA for use by State DOTs and MPOs. Because there is uncertainty regarding the ongoing funding of NPMRDS by FHWA, FHWA estimated the cost of the final rule under two scenarios. First, assuming that FHWA provides State DOTs and MPOs with the required data from NPMRDS, the 10-year undiscounted incremental costs to comply with this rule are \$144.0 million (Scenario 1). Alternatively, under “worst case” conditions where State DOTs will be required to independently acquire the necessary data, the 10-year undiscounted incremental costs to comply with this rule are \$205.5 million (Scenario 2). The total 10-year undiscounted cost is approximately 43 percent higher under Scenario 2 than under Scenario 1.

The final rule’s 10-year undiscounted cost (\$144.0 million in Scenario 1 and \$205.5 million in Scenario 2, both in 2014 dollars) decreased relative to the

proposed rule (\$165.3 million in Scenario 1 and \$224.5 million in Scenario 2, both in 2014 dollars). The FHWA made several changes that affected the cost estimate. These changes include updating costs to 2014 dollars from 2012 dollars and labor costs to reflect current Bureau of Labor Statistics (BLS) data. In addition, FHWA revised the final rule Regulatory Impact Analysis (RIA), found in the docket of this final rulemaking, to reflect: (1) The elimination of three of the proposed performance measures (removing the proposed NHPP measure for percent of the Interstate congested and merging two proposed peak-hour travel time measures under NHPP with the proposed excessive delay measure under CMAQ Traffic Congestion into one measure under CMAQ); (2) the elimination of one of the proposed performance metrics (for the Total Emissions Reductions measure); (3) the elimination of costs for the Initial Performance Report, which State DOTs have already submitted to FHWA; (4) the addition of two new performance measures (Percent of Non-SOV Travel measure and the GHG measure; and (5) the adjustment of level of effort and number of affected entities consistent with the new requirements under the final rule and updated population estimates.

The FHWA expects that the rule will result in significant benefits, although they are not easily quantifiable. Specifically, the rule will allow for more informed decisionmaking at a Federal, State, and regional level for NHS performance-, freight movement-, or congestion and emissions-related projects, programs, and policy choices. The rule will also yield greater accountability because MAP-21 mandated reporting increases visibility

<sup>4</sup> See Tables 3 and 4 in Section VII, Rulemaking Analysis and Notices.

<sup>5</sup> Bureau of Labor Statistics Employee Cost Index, 2014.

and transparency. The data reported to FHWA by State DOTs will be available to the public and will be used to communicate a national performance story.

The FHWA performed break-even analyses as the primary approach to quantify benefits. The FHWA identified four variables (or outcomes) for which to estimate break-even thresholds: (1) Number of passenger travel hours, (2) tons of transportation-related carbon dioxide emissions, (3) number of truck travel hours, and (4) kilograms of on-road mobile source emissions, comprising volatile organic compounds, nitrogen oxide, particulate matter, and carbon monoxide. The FHWA selected these variables because it is reasonable to assume that the performance measures will influence each of these variables relative to current baseline levels.

FHWA assumes that there will be no overall change in the total amount of expenditure on highway projects by State DOTs and MPOs. Instead, FHWA assumes that States and MPOs will choose a different mix of projects or delay some projects, relative to what they would have done without the rule, in order to fund projects that help to meet performance goals. There will be some costs to delaying or foregoing some projects, but their will be benefits from projects that are prioritized to meet performance goals. To perform a breakeven analysis, FHWA considered both these benefits and costs and considered how large of a net gain in benefits would be needed to offset the costs of the rule.

After identifying these variables, FHWA combined the final rule costs associated with the performance measures that will influence each variable. The FHWA expects that implementation of four of the rule's performance measures (the Travel Time Reliability measures, the PHED measure and the Percent of Non-SOV Travel measure) will influence passenger travel hours. The FHWA expects that implementation of the GHG measure will influence tons of carbon dioxide emissions. The FHWA expects that implementation of the Freight Reliability measure will influence number of truck travel hours. The FHWA expects that implementation of the performance measure for Total Emissions Reduction will influence kilograms of on-road mobile source emissions.

Two variables (number of passenger travel hours and number of truck travel hours) are associated with performance measures whose costs differ under two

scenarios feasible under the final rule; in Scenario 1, FHWA provides travel time data to State DOTs, and in Scenario 2, State DOTs acquire the necessary data independently. To account for this, FHWA performed the break-even analyses twice for these two variables (*i.e.*, once using Scenario 1 costs, and a second time using Scenario 2 costs). The costs associated with the remaining two variables (tons of carbon dioxide emissions and kilograms of on-road mobile source emissions) do not change under Scenarios 1 and 2; therefore, only one break-even threshold is calculated for each analysis. In all, FHWA presents six break-even thresholds: (1) Number of passenger travel hours under Scenario 1, (2) number of passenger travel hours under Scenario 2, (3) tons of carbon dioxide emissions, (4) number of truck travel hours under Scenario 1, (5) number of truck travel hours under Scenario 2, and (6) kilograms of on-road mobile source emissions.

The results show that the rule must result in the reduction of approximately 3.7 million hours of passenger car travel under Scenario 1 and 5.6 million hours under Scenario 2, 312,000 tons of carbon dioxide emissions, 980,000 hours of freight travel under Scenario 1 and 1.6 million hours under Scenario 2, and 29 million kilograms of total on-road mobile source emissions over 10 years: To generate enough benefits to outweigh the cost of the rule. The FHWA believes that the benefits of this rule will surpass this threshold. Therefore, the benefits of the rule are anticipated to outweigh the costs.

Relative to the proposed rule, the total number of hours of passenger travel time needed to be saved over the period of analysis increased for the break-even analysis covering the Travel Time Reliability measures and the CMAQ Traffic Congestion measures. The undiscounted cost of these performance measures in the final rule decreased from \$88.4 million over 11 years (in 2012 dollars) in the proposed rule to \$86.1 million over 10 years (in 2014 dollars) in the final rule under Scenario 1. Under Scenario 2, costs increased from \$123.9 million over 11 years (in 2012 dollars) in the proposed rule to \$132.2 million over 10 years (in 2014 dollars) in the final rule. The Percent of Non-SOV Travel measure was added to the final rule, but the additional costs of this requirement were outweighed by the cost reductions associated with the removal of the peak-hour travel time reliability performance measures. For the final rule, FHWA added a break-even threshold for the GHG measure

because it was not a part of the proposed rule. The undiscounted cost for Scenario 2 increased because a greater share of the travel time dataset costs under \$ 490.103 in Scenario 2 was attributable to these Travel Time Reliability measures and the CMAQ Traffic Congestion measures. Specifically, the share of data requirements costs is driven by the proportion of performance measures in each break-even analysis, which for these performance measures increased from 60 percent in the proposed rule to 75 percent in the final rule. In addition, moving from an 11-year period of analysis to a 10-year period of analysis affected the break-even point. The average annual number of hours of travel that need to be reduced increased from approximately 350,000 in the proposed rule under Scenario 1 to 370,000 in the final rule, and from approximately 500,000 in the proposed rule under Scenario 2 to 560,000 in the final rule.

The threshold for the NHFP performance measure break-even analysis significantly decreased in the final rule. This change was largely due to the elimination of the proposed Average Truck Speed performance measure. The undiscounted cost of freight performance provisions in the final rule is \$25.8 million (in 2014 dollars) under Scenario 1 and \$41.1 million (in 2014 dollars) under Scenario 2, compared to \$46.9 million (in 2012 dollars) under Scenario 1 and \$70.6 million (in 2012 dollars) under Scenario 2 in the proposed rule. Average annual number of hours of travel that need to be reduced decreased from 168,044 in the proposed rule to 98,224 in the final rule under Scenario 1, and from 252,896 hours in the proposed rule to 156,874 hours in the final rule under Scenario 2.

Regarding the break-even analysis for Total Emissions Reduction, units were changed from tons to kilograms based on revised rule language. The undiscounted costs of total emissions reduction decreased from \$30.0 million (in 2012 dollars) in the proposed rule to \$18.2 million (in 2014 dollars) in the final rule. The average annual amount of total emissions to be reduced decreased from 4,417 short tons (approximately 4 million kilograms) in the proposed rule to 2.9 million kilograms in the final rule.

Table 2 displays the Office of Management and Budget (OMB) A-4 Accounting Statement as a summary of the cost and benefits calculated for this rule.



TABLE 3—OMB A–4 ACCOUNTING STATEMENT

Category	Estimates			Units			Source/ citation
	Primary	Low	High	Year dollar	Discount rate (%)	Period covered	
Benefits							
Annualized Monetized (\$ mil- lions/year).	None ..... None .....	None ..... None .....	None ..... None .....	NA NA	7 3	NA ..... NA .....	Not Quantified.
Annualized Quantified .....	None ..... None .....	None ..... None .....	None ..... None .....	NA NA	7 3	NA ..... NA .....	Not Quantified.
Qualitative .....	More informed decision-making on congestion-, freight-, and air quality-related project, program, and policy choices; greater accountability due to mandated reporting, increasing visibility and transparency; enhanced focus of the Federal-aid highway program on achieving balanced performance outcomes.						Final Rule RIA.
Costs							
Annualized Monetized (\$/ year).	Scenario 1: \$15,145,514; Scenario 2: \$21,801,333.	.....	.....	2014	7	10 Years .....	Final Rule RIA.
	Scenario 1: \$14,717,670; Scenario 2: \$21,082,985.	.....	.....	2014	3	10 Years .....	
Annualized Quantified .....	None ..... None .....	None ..... None .....	None ..... None .....	2014 2014	7 3	10 Years ..... 10 Years .....	Final Rule RIA.
Qualitative							
Transfers .....	None						
From/To .....	From: .....			To:			
Effects							
State, Local, and/or Tribal Government.	Scenario 1: \$14,768,979 Scenario 2: \$21,795,847. Scenario 1: \$14,347,569 Scenario 2: \$21,077,992.	.....	.....	2014 2014	7 3	10 Years ..... 10 Years .....	Final Rule RIA.
Small Business .....	Not expected to have a significant impact on a substantial number of small entities			NA	NA	NA .....	Final Rule RIA.

**II. Acronyms and Abbreviations**

Acronym or abbreviation	Term	Acronym or abbreviation	Term	Acronym or abbreviation	Term
AADT .....	Annual Average Daily Traffic.	GHG .....	Greenhouse gas.	NPMRDS .....	National Performance Man- agement Research Data Set.
AADTT .....	Annual Average Daily Truck Traffic.	HPMS .....	Highway Performance Moni- toring System.	NPRM .....	Notice of proposed rule- making.
AASHTO .....	American Association of State Highway and Transpor- tation Officials.	HSIP .....	Highway Safety Improvement Program.	O <sub>3</sub> .....	Ozone.
ACS .....	American Community Survey.	HSP .....	Highway Safety Plan.	OMB .....	Office of Management and Budget.
CAA .....	Clean Air Act.	IFR .....	Interim Final Rule.	PM .....	Particulate matter.
CFR .....	Code of Federal Regulations.	LOTTR .....	Level of Travel Time Reli- ability.	PHED .....	Peak Hour Excessive Delay.
CMAQ .....	Congestion Mitigation and Air Quality Improvement Pro- gram.	MAP-21 .....	Moving Ahead for Progress in the 21st Century Act.	PHTTR .....	Peak Hour Travel Time Ratio.
CO .....	Carbon monoxide.	MPH .....	Miles per hour.	PRA .....	Paperwork Reduction Act of 1995.
CO <sub>2</sub> .....	Carbon dioxide.	MPO .....	Metropolitan Planning Organi- zations.	PSL .....	Posted Speed Limit.
DOT .....	U.S. Department of Transpor- tation.	NAAQS .....	National Ambient Air Quality Standards.	RIA .....	Regulatory Impact Analysis.
EO .....	Executive Order.	NCHRP .....	National Cooperation High- way Research Program.	RIN .....	Regulatory Identification Num- ber.
EIA .....	Energy Information Agency, U.S. Department of Energy.	NHFP .....	National Highway Freight Pro- gram.	SHSP .....	Strategic Highway Safety Plan.
EPA .....	U.S. Environmental Protection Agency.	NHPP .....	National Highway Perform- ance Program.	SME .....	Subject matter experts.
FAST Act .....	Fixing America's Surface Transportation Act.	NHS .....	National Highway System.	SOV .....	Single Occupancy Vehicle.
FHWA .....	Federal Highway Administra- tion.	NHTS .....	National Household Travel Survey.	State DOTs ..	State departments of trans- portation.
FPM .....	Freight Performance Meas- urement.	NHTSA .....	National Highway Traffic Safety Administration.	TMA .....	Transportation Management Areas.
FR .....	Federal Register.	NO <sub>x</sub> .....	Nitrogen oxide.	TMC .....	Traffic Message Channel.
				TTI .....	Texas Transportation Insti- tute.
				TTTR .....	Truck Travel Time Reliability.
				U.S.C. ....	United States Code.

Acronym or abbreviation	Term
VMT .....	Vehicle miles traveled.
VOC .....	Volatile organic compound.

### III. Background

The DOT implemented MAP-21's performance requirements through several rulemakings. As a summary, these rulemaking actions are listed below and should be referenced for a complete picture of performance management implementation. The summary below describes the main provisions in each rulemaking.

On March 15, 2016, FHWA published a final rule (81 FR 13882) covering the safety-related elements of the Federal-aid highway performance measures rulemaking that included the following: (1) The definitions that are applicable to the new 23 CFR part 490; (2) the process to be used by State DOTs and MPOs to establish their safety-related performance targets that reflect the safety measures; (3) a methodology to be used to assess State DOTs' compliance with the target achievement provision specified under 23 U.S.C. 148(i); and (4) the process State DOTs must follow to report on progress toward meeting or making significant progress toward safety-related performance targets. The final rule also included a discussion of the collective rulemaking actions FHWA intends to take to implement MAP-21 and FAST Act performance related provisions. Elsewhere in this issue of the **Federal Register**, FHWA published a second performance measures final rule which includes the following: (1) Final national performance management measures for the condition of NHS pavements and bridges; (2) the process to be used by State DOTs and MPOs to establish their pavement and bridge condition related performance targets that reflect the final measures; (3) the process State DOTs must follow to report on progress toward meeting or making significant progress toward meeting pavement and bridge condition related performance targets; (4) a methodology to be used to assess State DOTs' compliance with the target achievement provision specified under 23 U.S.C. 148(i); and (5) the minimum levels for the condition of pavement on the Interstate System and bridges carrying the NHS, which includes on- and off-ramps connected to the NHS.

The FHWA published the third national performance management measures NPRM on April 22, 2016, 81 FR 23806. In this NPRM, FHWA proposed national measures for the remaining areas under 23 U.S.C. 150(c)

that were not discussed under the first and second measure rules. The third rulemaking effort proposed performance measures to assess: (1) The performance of the Interstate System and non-Interstate NHS for the purpose of carrying out the NHPP; (2) freight movement on the Interstate System; and (3) traffic congestion and on-road mobile source emissions for the purpose of carrying out the CMAQ program. In addition, the NPRM proposed State DOT and MPO target establishment requirements for the Federal-aid highway program and performance progress reporting requirements and timing.

When FHWA began implementation of MAP-21, the three related Federal-aid highway performance measure rules were proposed to be published at the same time to allow for a single, common effective date for all three rules. The process to develop and implement all of the Federal-aid highway performance measures required in MAP-21, however, has been lengthy. In light of this, each of the three Federal-aid highway performance measures rules will have individual effective dates. The FHWA expects that even though each rule sets its respective effective date, the compliance schedule for all the rules will be aligned through a common performance period and reporting requirements. A timeline for Biennial Performance Reports is shown in Figure 1 in § 490.105(e)(1).

Although FHWA believes that individual implementation dates will help State DOTs and MPOs transition to performance based planning, FHWA will provide guidance to State DOTs and MPOs on how to carry out the new performance requirements to lessen any potential burden of staggered effective dates.

The FHWA also commits to assist State DOTs and MPOs as they take steps to manage and improve the performance of the highway system by implementing the new rules. As a Federal agency, FHWA is in a unique position to review and share strategies that can improve performance. The FHWA will continue to provide technical assistance, technical tools, and guidance to State DOTs and MPOs to assist them in making performance-based decisions. The FHWA intends to engage at a local and national level to provide resources and assistance to identify opportunities to improve performance and to assist State DOT and MPO compliance with the performance-related regulations. The FHWA technical assistance activities will include conducting national research studies, improving analytical modeling tools, identifying

and promoting best practices, training classes and workshops, preparing guidance materials, and developing data quality assurance tools.

### IV. Summary of the Notice of Proposed Rulemaking

This NPRM was published on April 22, 2016 (81 FR 23806). The NPRM proposed a set of national measures for State DOTs to use to assess the performance of the Interstate and non-Interstate NHS for the purpose of carrying out the NHPP; to assess freight movement on the Interstate System; and to assess traffic congestion and on-road mobile source emissions for the purpose of carrying out the CMAQ Program.

After consulting with State DOTs, MPOs, and other stakeholders and a review of nationally recognized reports, FHWA proposed eight national performance measures in these areas. To support the new measures, the NPRM proposed to establish standardized data requirements that prescribed State DOTs' travel time and emissions data practices. State DOTs and MPOs would use the National Performance Management Research Data Set (NPMRDS) to calculate the travel time and speed-related metrics, although the NPRM offered flexibility to State DOTs and MPOs to use alternative travel time datasets with FHWA's approval. For Total Emission Reduction measure, the NPRM required State DOTs and affected MPOs to use data included in the existing CMAQ Public Access System.

The NPRM also proposed to establish the processes for State DOTs and MPOs to establish and report progress toward achieving targets, and the process for FHWA to determine whether State DOTs have made significant progress in achieving targets. The FHWA selected the measures, data requirements, and related processes proposed in the NPRM after preliminarily determining that they represented the best choices for achieving consistency among State DOTs and MPOs in compiling accurate system performance, freight movement, traffic congestion, and on-road mobile source emissions performance information, following processes for target setting, and reviewing progress toward targets. The FHWA expected the proposed measures to enhance accountability and support a strong national focus on maintaining and improving the condition and performance of the Nation's highways, while minimizing additional burden on State DOTs and MPOs and maintaining reasonable flexibility for State DOTs and MPOs as they manage risk, differing priorities, and fiscal constraints. Lastly, FHWA anticipated that the proposed

measures could be implemented in the timeframe required under MAP-21, without imposing excessive burden on State DOTs.

#### *System Performance Measures*

The four system performance measures proposed in the NPRM were: (1) Percent of the Interstate System Providing for Reliable Travel; (2) Percent of the Interstate System Where Peak Hour Travel Times Meet Expectations; (3) Percent of the Non-Interstate NHS Providing for Reliable Travel; and (4) Percent of the Non-Interstate NHS Where Peak Hour Travel Times Meet Expectations.

#### *System Performance Data Requirements and Metrics*

In the NPRM, FHWA proposed calculating the performance measures using two performance metrics: The LOTTR metric and the Peak Hour Travel Time Ratio (PHTTR) metric. Under the proposal, State DOTs and MPOs would be required to calculate these metrics for all applicable roadway segments for the applicable time periods and report them to FHWA annually.

The NPRM also proposed that State DOTs coordinate with MPOs in order to establish and submit reporting segments to be used as the basis for calculating and reporting metrics to the FHWA and for State DOTs and MPOs to calculate the measures to assess Interstate System and non-Interstate NHS performance.

#### *Calculation of System Performance Measures*

The FHWA designed the proposed system performance measures to reflect a percentage of the system, by length, operating at a specified level of performance. In the NPRM, FHWA proposed a threshold level that represented reliable travel to highway users of LOTTR of 1.50. This LOTTR level represented the difference between the longer travel times (80th percentile) observed on a roadway segment and those that are normal travel times (50th percentile). For PHTTR, a threshold level of 1.50 represented peak hour travel times that meet expectations of State DOTs, MPOs, and local operating agencies. This PHTTR level represents a condition where observed (or estimated) travel times in large urbanized areas are no more than 50 percent higher than what would be desired for the roadway, as identified by the State DOT and MPO.

#### *Freight Movement on the Interstate System Measures*

The two freight movement measures proposed in the NPRM were: (1) Percent

of the Interstate System Mileage Providing for Reliable Truck Travel Time and (2) Percent of the Interstate System Mileage Uncongested.

#### *Freight Movement on the Interstate System Data Requirements and Metrics*

The FHWA proposed determining performance measures for freight movement using two metrics: TTTR and the Average Truck Speed metrics. For the TTTR metric, FHWA proposed having the State DOTs use the same basic method as discussed for the LOTTR metric to calculate truck travel time reliability. State DOTs also would calculate the Average Truck Speed metric for each reporting segment, which would be derived from truck travel speeds contained in the NPMRDS travel time data set.

#### *Calculation of Freight Movement on the Interstate System Measures*

The FHWA designed the proposed freight movement performance measures to reflect a percentage of the system, by length, operating at a specified level of performance. The NPRM proposed establishing the truck travel time reliability threshold at 1.50 to represent the level at which truck travel times become unreliable. This level represents a condition where travel time could be no more than 50 percent longer than what would be expected during normal travel time conditions. For average truck speed, the NPRM proposed that any travel speeds occurring below 50 mph would be representative of congested conditions for freight flow.

#### *Traffic Congestion Measure*

The proposed traffic congestion measure was Annual Hours of Excessive Delay Per Capita.

#### *Traffic Congestion Data Requirements and Metric*

The NPRM proposed one metric for traffic congestion: Total Excessive Delay (as measured in vehicle-hours) for each applicable reporting segment on the NHS. To develop the metric, the NPRM proposed that State DOTs with large urbanized areas that contain nonattainment or maintenance areas for any of the criteria pollutants under the CMAQ program use a travel time data set like NPMRDS (as is required for the system performance and freight movement performance measures). The NPRM proposed two threshold travel speeds to indicate when operating conditions have deteriorated to the point that excessive travel time delays would occur. Any measured travel speeds below the threshold would

represent the operating condition level that would result in excessive delays. These thresholds were 35 mph for Interstates, freeways, or expressways and 15 mph for all other NHS roadways.

Using these thresholds and travel time segment lengths, a State DOT would determine the Excessive Delay Threshold Travel Time for each travel time segment to represent the time that it could take for a vehicle to traverse the reporting segment before excessive delay would occur. The excessive delay would be determined by comparing the recorded average travel time to the Excessive Delay Threshold Travel Time for the corresponding segment.

#### *Calculation of Traffic Congestion Measure*

The proposed traffic congestion performance measure would be calculated by summing the total excessive delay of all reporting segments in the applicable area and then dividing this total by the population for the applicable area.

#### *On-Road Mobile Source Emissions Measures*

The proposed on-road mobile source emissions measure was Total Tons of Emissions Reduced from CMAQ Projects for Applicable Criteria Pollutants and Precursors.

#### *On-Road Mobile Source Emissions Data Requirements and Metric*

Under the NPRM, State DOTs and MPOs would calculate the annual emission reductions for projects reported to the CMAQ Public Access System in a Federal fiscal year. The metric would be calculated for each CMAQ-funded project and for each applicable criteria pollutant and precursor. The proposed method would convert the emissions reductions reported in the CMAQ Public Access System from units of kg per day to short tons per year. The emissions reductions would be summed for all projects within the applicable reporting area, by criteria pollutant or precursor, for a Federal fiscal year.

#### *Calculation of On-Road Mobile Source Emissions Measure*

Under the NPRM, State DOTs and MPOs would calculate on-road mobile source emissions reductions by summing the annual tons of emissions reduced by CMAQ projects by criteria pollutant, using the 2- and 4-years of available data from the Public Access System.



### Potential GHG Performance Measure

The NPRM also sought comment on whether and how to establish a CO<sub>2</sub> emissions measure in the final rule. The NPRM posed questions to the public on how GHG emissions could be estimated and used to inform planning and programming decisions to reduce long term emissions. The NPRM indicated that a potential GHG emissions performance measure would be best measured as the total annual tons of CO<sub>2</sub> from all on-road mobile sources. The FHWA asked for comment on the potential establishment and effectiveness of a GHG measure, and on various considerations in the design of a measure.

### Performance Targets

The NPRM described a process to be used by State DOTs and MPOs to establish quantifiable statewide performance targets to be achieved over a 4-year performance period, with the first performance period starting in 2018. In the NPRM, FHWA proposed that a State DOT or MPO could consider a number of factors (e.g., funding availability and local transportation priorities) that could impact the targets they ultimately establish. The FHWA discussed the statutory requirement that State DOTs establish 2- and 4-year targets for the eight national performance measures to assess performance of the Interstate and non-Interstate NHS for the purpose of carrying out the NHPP, freight movement on the Interstate system, traffic congestion, and on-road mobile source emissions within 1 year after the effective date of the rule. The MPOs would establish targets by either supporting the State DOT's statewide target, or defining a target unique to the metropolitan planning area each time the State DOT establishes a target. In accordance with MAP-21, the NPRM proposed providing MPOs with an additional 180-day period to set targets following the date on which the State DOT established their targets.

### State DOT and MPO Reporting

The NPRM proposed that State DOTs submit biennial reports to FHWA on the condition and performance of the NHS. The FHWA proposed that State DOTs submit their targets in a baseline report at the beginning of each performance period and report progress in achieving targets at the midpoint and end of the performance period. State DOTs would be allowed to adjust their 4-year target at the midpoint of the performance period. The MPOs would not be required to provide separate reporting to

FHWA. However, State DOTs and MPOs would need to agree on a reporting process as part of their Metropolitan Planning Agreements.

### Determination of Significant Progress

The NPRM proposed the method for FHWA to determine if State DOTs achieved significant progress toward their target based on an analysis of estimated condition/performance and measured condition/performance of each of the targets. If applicable, State DOTs could have the opportunity to discuss why targets were not achieved or significant progress was not made. If a State DOT failed to achieve significant progress, then the State DOT would be required to document in their next biennial performance report, and encouraged to document sooner, the actions they would undertake to achieve their targets.

## V. Response to Comments

This final rule is based on FHWA's review and analysis of comments received. The FHWA received 8889 letters to the docket, including letters from 43 State DOTs and local government agencies, more than 100 associations and advocacy groups, over 7800 individuals and consultants, and various other government agencies as well as 3 letters cosigned by 19 U.S. Senators. Of all the letters to the docket, 95 percent specifically addressed a request for a multimodal performance measures and greenhouse gas performance measure or both. Given the large number of comments received, FHWA has decided to organize the response to comments in the following manner. This section of the preamble provides a response to the most significant issues raised in the comments received, organized by summarizing and responding to comments that raise significant issues applicable to the NPRM and then those that raise issues applicable to specific subparts of the rule. Responses to all other comments (*i.e.*, comments deemed less significant) are located in a separate comment/response document posted in the docket for this rulemaking.

### A. Significant Issues Raised in Comments

The following summarizes the most significant issues raised in the comments to the NPRM and describes how FHWA has addressed these issues. More specific detail regarding these issues is provided in the sections that follow (Sections V–B through V–F).

## 1. Summary of Significant Issues Raised in the Comments

*The NPRM Was Too Focused on Vehicle Travel Time*—Many commenters expressed concern that 7 of the 8 proposed measures were based on vehicle travel time data.

*The Rule Needs to Account for All People*—The largest volume of comments received expressed concern that the proposed measures did not appear to reflect the travel experience of all people using the system and, in particular, those that use public transportation, walk, or bike.

*The Rule Needs to Account for Multimodal Travel*—Many commenters perceived that the proposed measures would encourage highway expansion and would not recognize strategies that provide for greater transportation choices.

*The Proposed Rule Was Overly Complex*—Many State DOTs and MPOs raised concern with the complexity of the design of the measure calculations and asked for the method to be simplified.

*The Coordination Requirements in the NPRM Would be Difficult to Implement*—Many State DOTs and MPOs expressed concern with the level of coordination required to agree on data sources, travel time expectations, and targets for urbanized areas.

*The Rule Should or Should Not Include a Greenhouse Gas Measure*—Comments were received both supporting and objecting to the inclusion of a GHG emissions measure in the final rule. Supporting comments came from thousands of individual citizens, several State DOTs, and hundreds of other organizations, including local governments, non-profits, and businesses. Comments against a GHG measure came from several State DOTs and 27 industry associations.

*The NPRM's Proposed Speed Thresholds Were Problematic*—Commenters expressed concerns with the use of an absolute speed threshold to determine congested conditions and the use of a single threshold to define reliable conditions.

## 2. Summary of Major Changes Made in Response to These Comments

The FHWA made a number of changes in the final rule in response to the comments received. These changes include the following:

*The FHWA revised the suite of measures to simplify the rule and reduce the burden of compliance.* The final rule contains 7 measures. Four of these are derived from vehicle travel

times, compared to 7 in the NPRM, 3 of which reflect all people traveling on the system. More specifically, the final rule does not include one of the proposed measures that focused on freight congestion and merges three additional proposed measures (two under NHPP System Performance and one under CMAQ Traffic Congestion) into one new measure, focused on excessive delay experienced during peak hours that will be under CMAQ Traffic Congestion. In addition, the final rule includes two new measures:

■ **Under NHPP System Performance**—The rule includes a new GHG measure to assess system performance, specifically the percent change in CO<sub>2</sub> emissions from 2017, generated by on-road mobile sources on the NHS. State DOTs will be required to estimate CO<sub>2</sub> emissions based on annual fuel sales, EIA published emission conversion factors, and the proportion of statewide VMT that occurs on the NHS. MPOs will be provided options as to how they calculate CO<sub>2</sub> emissions. All State DOTs, and MPOs that have NHS mileage in their metropolitan planning area, will be required to establish targets and report on progress. State DOTs will report annual CO<sub>2</sub> emissions every 2 years to FHWA in their Biennial Performance Report. The FHWA will assess every 2 years if the State DOT has made significant progress towards the achievement of their target.

■ **Under CMAQ Traffic Congestion**—The rule includes a new measure to assess modal share percentage, specifically Percent of Non-SOV, Travel, which includes travel avoided by telecommuting. A minimum option for doing so will be use of the American Community Survey “Journey to Work” data. States and MPOs will be provided the opportunity to use localized surveys or measurements to report on this measure and will be encouraged to report any data not available in national sources today to FHWA (e.g., bike counts).

*The final rule simplifies the process.* The FHWA simplifies the required data processing and calculation of the metrics. In general these steps include:

- Use of 15 minute travel time intervals instead of 5 minute intervals;
- Consistent time periods for all travel time-derived measures;
- Recognition of commercial data sets that could be pre-approved by FHWA;
- Removal of the requirement to “fill” missing data with travel times at posted speed limits; and
- Use of all vehicle travel times, regardless of speed, to replace missing truck travel times.

■ In addition, FHWA is committed to working with State DOTs and MPOs to establish a pooled fund effort to acquire services and tools that will help with the processing and analysis of data.

*The final rule modifies measures to address comments regarding the overreliance on vehicle travel times and the need to include multimodal travel.* The final rule includes three measures that reflect the number of people traveling on the system, including two measures that have been modified so they are based on person-travel instead of vehicle travel, and a new multi-modal percent of non-SOV travel measure mentioned above. Specifically, the final rule changes the weighting of the Travel Time Reliability measures from system miles to person-miles traveled using overall occupancy factors from national surveys. It also changes the expression of the PHED measure to account for all travelers using the NHS based on volumes and occupancy factors for cars, buses, and trucks. The FHWA will provide occupancy factors based on national surveys and NTD data. State DOTs and MPOs may use more accurate local data if such data are available. The final rule creates the new Percent of non-SOV measure for CMAQ traffic congestion.

Furthermore, FHWA will revisit this issue and consider approaches to more effectively consider multimodal performance in the measures after the completion of ongoing research regarding multimodal system performance measures in fall, 2018.

*The final rule addresses concerns with the use of absolute thresholds.* The rule changes the proposed excessive delay threshold from 15/35 mph to 20 mph or 60 percent of the posted speed limit, whichever is greater. The rule encourages State DOTs to report the full extent of posted speed limits to the HPMS and requires that these be reported for applicable areas under the CMAQ Traffic Congestion measures. In addition, the rule changes the form of the Freight Reliability measure from one based on the percent of the system providing for reliable travel to an overall average truck reliability index for the Interstate. This change removes the 1.50 threshold in the definition of “reliable travel” for trucks and recognizes incremental improvements that could be made to improve reliability.

*The final rule addresses comments regarding applicability of the rule.* Specifically, the rule revises the applicability of the CMAQ Traffic Congestion measures to begin with urbanized areas (in nonattainment or maintenance) with populations over 1 million in the first performance period

(4 years begin in 2018) and then expands the applicability in the second reporting period (beginning in 2022) to urbanized areas (in nonattainment or maintenance) with a population over 200,000. Additionally, the final rule moves the date of measure applicability determination up 1 year earlier. The NPRM proposed that FHWA would determine measure applicability based on the most recent available data on October 1 of the first year in the performance period. The final rule changes this to be October 1 of the year before the beginning of a performance period. Finally, the final rule changes the use of the most recent decennial census population to determine measure applicability and to normalize the PHED measure to the most recent annual population estimate published by the U.S. Census.

*The final rule relaxes some CMAQ Emission Requirements.* The rule revises the definition of “Maintenance Area” to exclude any areas that have completed their 20 year maintenance plan. It also removes the requirement to develop a “metric” (by rolling the metric step into the measure calculation) to simplify the process. In addition, under the final rule, States and MPOs can request their areas to be excluded from the CMAQ performance requirements at the midpoint of the performance period if they reach attainment status (or achieve their 20 year maintenance plan).

#### B. Subpart A—General Information

##### 1. Implementation Date Alignment and Coordination

The Georgia DOT commented that implementation dates for NPRMs (Asset Management, Pavement and Bridge Performance Measures, etc.) related to the new Statewide and Metro Planning Rule should be aligned to ensure accuracy and consistency. The Florida Metropolitan Planning Organization Advisory Council recommended aligning the various reporting due dates. While each rulemaking may not be finalized at the same time, the commenter requested that FHWA set a future point in time when all reporting of measures will align. The Atlanta Regional Commission (ARC) also recommended aligning the schedule for safety, pavement, bridge, travel time reliability, peak hour travel time, freight movement, traffic congestion, and on-road mobile source emissions target setting and reporting into one consolidated rotation. The New York State Association of Metropolitan Planning Organizations (NYSAMPO), Georgia Association of Metropolitan Planning Organizations, and American



Association of State Highway and Transportation Officials (AASHTO) urged FHWA to use a single effective date for all three performance management rules.

Although FHWA anticipated establishing one common effective date for the three performance management rules, the length of the rulemaking process made that approach impractical. Each rule has its own effective date. This approach allows FHWA, State DOTs, and MPOs to begin implementing some of the performance management requirements before all the rules are issued. In this final rule, FHWA aligned the performance periods (described in § 490.105(e)(4)(i)) and State Biennial Performance Report due dates (described in § 490.107) with the pavement and bridge condition measures for the second performance management rule in effort to consolidate reporting requirements. Throughout the process for all related performance management rulemakings (e.g., National Highway System Asset Management Plan,<sup>6</sup> National Performance Management Measures for Pavement and Bridge Condition rule), FHWA has worked to coordinate the implementation dates for all of the rules for consistency and time alignment.

## 2. Reporting and Implementation Dates

The Michigan DOT, Macatawa Area Coordinating Council, and Ozarks Transportation Organization recommended designating the first performance period as a pilot period for the system performance measures. The National Association of Regional Councils (NARC) recommended postponing target establishment requirements to the second performance period. The Orange County Transportation Authority, Oregon Metro Council and the Joint Policy Advisory Committee on Transportation, Texas DOT, and TRANSCOM urged that sufficient time needs to be provided in order to effectively and appropriately develop and deploy target setting and implementation processes. The New York City DOT recommended that FHWA should coordinate with MPOs and State DOTs to set a reasonable and achievable implementation timeline. The COMPASS requested postponing target setting until transportation agencies have had a chance to familiarize themselves with the

NPMRDS data and to develop current and forecasted reliability and speed measures. The AASHTO and Iowa, Maryland, and New Jersey DOTs recommended that FHWA consider a phased approach which includes a 2-year testing period following the effective date of the final rule to allow State DOTs and MPOs to develop “non-binding targets” in order to more fully understand the use of the data and the implications of those targets. The San Francisco County Transportation Authority recommended that FHWA should coordinate with MPOs and State DOTs to set a reasonable and achievable implementation timeline. The DOTs of Idaho, Montana, South Dakota, North Dakota, and Wyoming and AASHTO suggested including “waiver provisions of part 490, in whole or part, with or without time limits or other conditions, and/or extend deadlines, for good cause shown” because they said that the new 23 CFR part 490 is a complex and multifaceted rule so that there will be unanticipated or unusually difficult circumstances in its implementation. The New York State Association of MPOs noted that a separate NPRM on MPO Coordination and Planning Area Reform was issued jointly by FHWA and FTA on June 27 and said that the proposed rule addresses “MPO geography.” The New York State Association of MPOs recommended that consideration of the implementation of this rule be suspended until the MPO Coordination and Planning Area Reform rule becomes final.

The FHWA appreciates the comments received regarding the implementation dates and reporting dates for this rule. However, MAP–21 establishes the target establishment dates and reporting dates for this rule. State DOT target establishment “not later than 1 year of the effective date of this rule” in § 490.105(e)(1) is based on a statutory requirement under 23 U.S.C. 150(d). The date for reporting progress toward targets of October 1, 2016, is also based on a statutory requirement under 23 U.S.C. 150(e), which requires State reporting “not later than 4 years after enactment of MAP–21 and biennially thereafter.” As indicated in the NPRM, FHWA believes the phase-in approach will allow sufficient time for State DOTs and MPOs to become more proficient in managing performance of non-Interstate roadways and congestion on the NHS in applicable urbanized areas as the coverage of the data becomes more complete in the NPMRDS. The FHWA retains in the final rule the phase-in requirement language in § 490.105(e)(7), (e)(8)(vi), and (f)(5)(vi) for the Non-

Interstate NHS Travel Time Reliability measure in § 490.507(a)(2) and the PHED measure in § 490.707(a), respectively. This phase-in will only require State DOTs to establish 4-year targets for the first performance period for this rule (reported in the first State Biennial Performance Report) for non-Interstate NHS Travel Time Reliability measure and the PHED measure. Under this final rule, at the midpoint of the first performance period, State DOTs will have the option to adjust the 4-year targets they established at the beginning of the performance period in their Mid-Performance Period Progress Report (due in October 2020). This option will allow State DOTs to consider more complete data in their decisions on the 4-year targets for non-Interstate NHS Travel Time Reliability and the PHED measures in applicable urbanized areas.

The Chicago Metropolitan Agency for Planning commented that the effective date of this regulation should be set 1 year after FHWA provides an NPMRDS data set with sample sizes for each epoch-TMC record. The commenter said that this timeline would allow time for agencies to determine which records have low sample sizes and collect probe data.

The NPMRDS has been available since July 2013, and many State DOTs and MPOs have been using the NPMRDS for over 3 years. The final rule and schedule for baseline reports and target establishment clarify how much time there is to prepare the data. In general, State DOTs and MPOs will have approximately 18 months to process data before the first set of metric data is required to be submitted to FHWA. The FHWA has simplified several of the measures to reduce the calculation burden, thereby reducing the amount of time necessary for State DOTs or MPOs to prepare the data.

The FHWA also acknowledges the comment regarding deferring implementation of this final rule until completion of the MPO Coordination and Planning Area Reform rulemaking. The FHWA plans to issue guidance on dealing with metropolitan planning area change during a performance period. The FHWA believes that the implementation timeline provided in this final rule provides sufficient lead time to accommodate any requirements that may arise out of a final MPO rule. So, the FHWA declines to defer the implementation of this rule.

<sup>6</sup> Final rule on “Asset Management Plans and Periodic Evaluations of Facilities Repeatedly Requiring Repair and Reconstruction Due to Emergency Events” (October 2016)—**Federal Register** Vol. 81, No. 205 RIN 2125–AF57, Docket No. FHWA–2013–0052: <https://www.gpo.gov/fdsys/pkg/FR-2016-10-24/pdf/2016-25117.pdf>.



### 3. Accessibility and Connectivity

The FHWA received many comments<sup>7</sup> urging FHWA to establish an accessibility performance measure. The California Association of Councils of Government (CALCOG) said that Federal databases should be made available to States and MPOs to support the monitoring of accessibility metrics. The Southern California Association of Governments (SCAG) said it currently measures accessibility by taking afternoon or PM peak period travel demand model results for the base and forecast years and identifying the percentage of commute or home-based work trips that are completed within 45 minutes. The Delaware Valley Regional Planning Commission (DVRPC) recommended “shorter multimodal journey-to-work travel time than average” and “number of jobs accessible within a given time budget” as accessibility measure.

The FHWA recognizes that accessibility and connectivity are important aspects of successful transportation systems that serve all users. In addition to the comments described above, stakeholder comments on these issues during outreach before publication of the NPRM expressed a variety of views, including that the establishment of an accessibility measure might encourage greater consideration of non-auto travel modes like transit, carpooling, walking, and biking. The FHWA agrees that the time-based measures proposed in the NPRM, such as the traffic congestion excessive delay measure, may not capture modal options, modal usage, or better accessibility. As described above, the final rule establishes a modal share measure that will do much to address

these concerns. While the final rule does not include a measure dedicated to directly assessing transportation connectivity or accessibility, the rule reflects a necessary balancing of performance management needs across a broad spectrum and implementation burdens on the State DOTs and MPOs.

The FHWA is working on several fronts to address accessibility and connectivity issues outside of this rulemaking. The FHWA, in cooperation with FTA, is actively working with transportation operating agencies and planning organizations on efforts to understand and advance best practices in assessing and managing transportation network connectivity to improve public accessibility to essential services. Through the Department’s Ladders of Opportunity initiatives, efforts are currently underway to evaluate how measures can be used to assess accessibility/connectivity.<sup>8</sup> These initiatives will test different approaches to measure performance in this area that will help DOT better understand if and how accessibility and connectivity performance can be measured effectively at a local, State, and national level. The FHWA will use the results of these efforts to determine if a measure to assess accessibility/connectivity can be integrated into the Federal-aid Highway Program’s performance management requirements in the future.

### 4. Definition of Mainline Highway

Illinois DOT supports the definition of mainline highways to exclude ramps, shoulders, turn lanes, etc., but expressed concern that the NPRMDS does not exclude these parts of the transportation system. The commenter said that this will lead to extensive manual work to identify and remove these parts of the transportation system from the data it would have to use to comply with the proposed rule.

Texas DOT commented that “mainline highway” includes the primary traveled portion of the roadway and excludes ramps, climbing lanes, shoulders and non-normally traveled pavement surfaces. The commenter said the definition would seem to include managed lanes or high occupancy toll lanes. According to Texas DOT, traffic on these lanes typically travels at a higher rate of speed, which may influence the travel time reliability and percent of the Interstate System mileage that is uncongested. Texas DOT inquired whether FHWA considered these lanes to be part of a “mainline highway.” Florida DOT suggested that TMC should have categories for general

purpose lane, separated managed lane, separated collector/distributor, and ramp.

The Washington State and New York State DOTs, NARC, and Portland Metro Region MPO commented that managed lanes may be omitted in system performance calculations. They stated that the proposed rule would likely mask benefits from HOV and HOT lanes, toll roads, transit, and other operational enhancements and could discourage investment in these best practices. The Washington State DOT and NARC requested that FHWA either seek a way to differentiate the data with the data provider or account for HOV, HOT, toll roads, and other managed lanes. The AASHTO commented that FHWA should allow State DOTs the flexibility to better address the significant role that managed lanes play in the operation of the transportation system, as many regions in the United States have implemented some aspect of management lanes. The AASHTO recommended that FHWA develop an approach in the final rule that allows, but does not require, State DOTs and MPOs to specifically address managed lanes on their roadway network either through an improved NPRMDS that distinguishes between general purpose and management lanes or through supplementary analysis that takes into account the benefits of the managed lanes. The Los Angeles County Metropolitan Transportation Authority and Southwest Energy Efficiency Project commented that the proposed measure for congestion focuses exclusively on vehicle speed, ignoring the significant role that public transit, high occupancy/managed lanes, and active transportation have in reducing congestion and improving overall performance of the regional transportation system.

The FHWA agrees that ramps should not be included in measure calculations or in the NPRMDS dataset as the travel time derived measures are only applicable to mainline roadways. The next procurement of the NPRMDS will have a requirement to report mainline NHS segments only. If any ramp segments appear in the NPRMDS, State DOTs and MPOs should notify FHWA so these ramp segments can be removed in future NPRMDS deliverables.

The FHWA actively promotes managed lanes as a strategy for managing operations, which can include reducing congestion and increasing person throughput. However, at this time, it is difficult to delineate these lanes in both the segment and probe data. Lane-specific speed data are not available through the NPRMDS unless

<sup>7</sup> American Association On Health and Disability and the Lakeshore Foundation, American Council of Exercise, American Public Transportation Association, BikeWalkLee, California Association of Councils of Government, Chicago Metropolitan Agency for Planning (CMAP), City of San Antonio, Delaware Valley Regional Planning Commission, Los Angeles County Metropolitan Transportation Authority, Mid-Ohio Planning Commission, Mountainland Association of Governments, Utah Department of Transportation, Utah Transit Authority, Wasatch Front Regional Council, Nashville Area Metropolitan Planning Organization, NARC, National Coalition for Promoting Physical Activity, National League of Cities, National Recreation and Park Association, New York Bicycling Coalition, North Front Range Metropolitan Planning Organization, Oregon Metro Council and the Joint Policy Advisory Committee on Transportation, Parks & Trails New York, Regional Transportation Alliance, Southern California Association of Governments, Southwest Energy Efficiency Project (SWEET), Transportation for America (T4A), Trust for America’s Health, Utah Transit Authority, as well as 1,114 citizen letter campaigns sponsored by National Complete Streets Coalition, 150 citizen letter campaigns sponsored by T4A, and 11 citizen letters.

<sup>8</sup> <https://www.transportation.gov/opportunity>.

the managed lane is listed as a separate NHS facility (*i.e.*, different TMC code). In addition, not all probe data are able to accurately differentiate traffic speed by lane on a roadway. The FHWA does not believe it is possible, at this time, to uniformly separate managed lanes given the available data. If State DOTs have appropriate segment-specific data for managed lanes, State DOTs may certainly track these and include this information in any reports. State DOTs or MPOs may use alternative data sources that include separate segments for managed and conventional lanes provided these data meet the requirements for equivalent data in section 490.103. State DOTs and MPOs are welcome to provide information on managed lanes in performance reports.

#### 5. Data Processing and Conflation of Datasets

Alaska, Arkansas, California, Ohio, Pennsylvania, Utah, Vermont, and Washington DOTs, AMPO, Georgia Association of MPOs, and many others asked FHWA to process the NPMRDS and develop a tool to calculate metrics. Many commenters made the same argument that the burden on States and MPOs is too great if they are each to process the NPMRDS themselves, and that this would represent a greatly inefficient duplication of effort. The AMPO and others agreed that processing the database nationally also would help ensure consistency across the country and thus aid in comparisons nationally. These commenters said that this processing should include all imputation needed to make the data set ready for calculations. Several commenters suggested that FHWA develop a Web-based tool for State DOTs and MPOs to process data and calculate the required metrics. Caltrans further suggested that Federal funding be made available for training. However, the New York Metropolitan Transportation Council suggested that States and MPOs should have the option, if they so choose, to do their own calculations of the required performance metrics and measures.

Others, such as Virginia DOT and TRANSCOM, more generally requested technical assistance and support for States and MPOs in undertaking metric and measure calculation. Michigan DOT suggested a case study of what the process and outputs would look like. The Mayors Innovation Project would like to see commercially available tools to relate speed, modal network availability, and location to help assess not only speed but accessibility.

Many comments noted the particular burden of handling the NPMRDS,

processing and developing the metrics even if they did not call on FHWA to perform these tasks. Commenters expressed concern about not only the time and resources it would take but also if State DOT and MPO staff would even have the skills to perform these tasks at all. Many commenters were concerned that the NPRM required data from both Traffic Message Channel (TMC) networks (*e.g.*, NPMRDS) and linear referencing systems (*e.g.*, HPMS) and that these two datasets are not conflated. Commenters requested that either FHWA provide conflated datasets or a tool for States to use. The FHWA recognizes and appreciates the effort required to download, store, process, and analyze the data in the NPMRDS in order to calculate the metrics required in the rule (and this is taken into account in the RIA). Some organizations have expressed that they are ready and capable of providing technical services and online applications to process and analyze data. The FHWA believes that the most effective way to address the concerns regarding the challenges with conflating data sets (linking travel time data with other roadway information such as traffic volumes) is by having organizations that have the skills and resources to handle and process large data sets provide these services and tools to State DOTs, MPOs, and FHWA. The FHWA is committed to working with State DOTs and MPOs to set up a pooled fund approach to data processing, analysis, metric/measure calculation and reporting, and potentially additional analysis tools. The economies of scale of all interested parties working together should help alleviate burdens. In addition, the Advanced Transportation and Congestion Management Technologies program offers grants that could be used to support the collective need to provide technologies that could be used by State DOTs and MPOs to better manage system performance. The FHWA is using authorized funds under the new Performance Management Data Support Program (FAST Act Sec. 6028) to fund the acquisition of travel time data and to develop enhancements to the HPMS to support the data requirements of this rule.

The FHWA anticipates that the next NPMRDS contract will include HPMS referencing for each TMC segment. This will simplify the process to conflate the travel time data to roadway information contained within the HPMS. The FHWA is also committed to help State DOTs and MPOs understand how they can most effectively process and analyze the travel time data sets. Technical support

is already included in the NPMRDS contract where quarterly webinars are provided and technical assistance is offered on request. The FHWA intends to build on these services to support State DOT and MPO needs for assistance.

#### 6. Population Estimates

The Portland Metropolitan Region MPO recommended regional population be taken from Census-based annual estimates already obtained by MPOs for regional planning purposes from their own staff, reputable academic institutions, or qualified consultancies. The North Jersey Transportation Planning Authority (NJTPA) recommended using the most recent population estimate for the urbanized area. This commenter added that a constant population, as proposed, means that the only changes being measured and reported are the changes in delay; therefore, increases in delay associated with an increased population would not factor into the measure. The T4A also said that America's urban areas are witnessing large population shifts that have the opportunity to be omitted from two 4-year reporting cycles because of the reliance on decennial U.S. Census population estimates. This commenter requested discussion in the final rule for how States and MPOs could use population estimates from 5-year ACS estimates for each year reporting cycle.

The Oregon and Washington State DOTs stated that the proposed language, to keep the population numbers used in the delay measure constant for the duration of the performance period, would give an inaccurate picture of congestion in fast-growing cities as more people use the roadways. The Washington State DOT requested that the delay measure be derived by dividing the total annual excessive delay by an estimated commuter population.

The FHWA agrees with the comments that suggested the use of annual population estimates to determine measure applicability and to calculate the PHED measure. The FHWA believes that the use of annual estimates will provide for a more accurate estimation of population at the time when applicability determinations are made and when annual measures are calculated.

Therefore, the final rule uses the most recent annual population estimate published by the U.S. Census Bureau (in lieu of Decennial Census population estimates) to compute the PHED measure and to determine which State DOTs and MPOs will be implementing



CMAQ traffic congestion measures (both PHED and non-SOV Travel). Please see discussion section for §§ 490.709(g) and 490.105(e)(8)(iii) and (f)(5)(iii) for more details. To maintain consistency throughout all CMAQ measures, the final rule also uses the most recent annual population estimate published by the U.S. Census Bureau to determine which MPOs are required to develop and submit MPO CMAQ Performance Plan (Section 490.107(c)(3)).

#### 7. Replacement of Missing Travel Time Data

Several commenters expressed concern about replacing travel time data missing from the NPMRDS with imputed data. Chicago Metropolitan Agency for Planning stated that imputation should be avoided as it may lead to under- or over-reporting, depending on the level of congestion present, and suggested that if imputation is used, FHWA should apply consistent rules for the replacement of missing values for all measures. Ozarks Transportation Organization, Oregon Metro Council and the Joint Policy Advisory Committee on Transportation, Association of Metropolitan Planning Organizations, and Puget Sound Regional Council argued that imputation, while perhaps unavoidable, would increase inaccuracy in data sets.

Some commenters, including North Jersey Transportation Planning Authority and Florida DOT, expressed general support for replacing missing travel time data with imputed data. Nebraska Department of Roads argued that the proposed restriction on using imputed data is inconsistent with the current use of estimates in the NPMRDS and further recommended that FHWA permit the use of estimates in alternative data sets. The AASHTO suggested that imputed data be smoothed and include information on whether the data were imputed at multiple confidence intervals. The commenter also recommended that in the future FHWA should require the provider(s) of NPMRDS data to follow recognized, industry-accepted methods for imputing incomplete or missing data. The New York State Association of Metropolitan Planning Organizations argued that the use of imputed data should be conditional on vendors providing details about the data (e.g., the methodology used to develop them).

Many commenters expressed support for imputation based on sources other than speed limit data, arguing that the alternatives have tested well in the field and are more accurate, efficient, and sophisticated than speed limit data are, and recommended that FHWA allow

States the flexibility to use such data from providers like HERE, INRIX, and TomTom. These commenters included DVRPC, New York State Association of Metropolitan Planning Organizations, AASHTO, and the State DOTs of Texas, Washington State, Oregon, Connecticut, New York, and Pennsylvania. The AMPO suggested that where observed data are unavailable, travel time interpolated between adjoining segments should be used instead of speed limit data. The Kentucky Transportation Cabinet recommended that, depending on the time of day for which data is required, imputation could involve either treating missing data as a maximum travel time or inserting historical data into the data set.

The final rule provides State DOTs the flexibility to select and use an alternative data set to the NPMRDS provided the data are considered “equivalent” as defined in section 490.103(e). The FHWA has established these requirements to ensure, through FHWA approvals, that data from different data sources are nationally comparable. The FHWA recognizes the concern with the degree of missing data and outliers in the NPMRDS as it existed when the NPRM was published. The FHWA supports approaches to filling in missing data provided they are based on observed travel during the same timeframe and roadway location, which is typically referred to as path processing. The original contract for the NPMRDS only allowed point-based probes to be included in the dataset (*i.e.*, that determine travel time based on the detection of a vehicle at one point in location). This method often recorded vehicles waiting at signalized intersections or missed them entirely during the detection period (5 minutes). The FHWA is currently updating the NPMRDS to allow for the determination of individual travel times during specified time intervals based on tracking the movement of single vehicles passing through a series of segments. This approach will maintain FHWA’s desire to use observed travel times without the challenges associated with single point detection. The FHWA is confident that travel time providers will be able to provide data sets that follow this approach.

To maintain consistency at a national level and to maintain an acceptable level of bias from the actual travel times occurring on the roadway throughout the year, FHWA discourages the use of methods to predict travel times based on historical trends or reference speeds. Consequently, to address concerns regarding the prohibition of the use of

imputed travel times, FHWA has revised the final rule in section 490.103(e)(5)(iii) to allow “observed” travel times that may be derived from travel times reported over a longer time period of measurement (path processing or equivalent). The final rule will not allow missing data to be filled with data that are imputed from historical data or predicted based on statistical analysis approaches.

#### 8. Segment Lengths

The AASHTO and Illinois DOT expressed concern that the NPMRDS TMC segments are not consistent lengths across months and years. To address this issue, AASHTO recommended that FHWA require the NPMRDS provider to maintain segment definitions existing at the start of the year throughout the year. Because under this scenario, new roads and interchanges would not show up in the NPMRDS until the year following their opening, AASHTO commented that this approach would allow some time for State DOTs to get familiar with how new facilities are being used by the traveling public before they need to set targets and report on their performance. The Illinois DOT commented that the changing TMC segments would result in having to maintain conflation across each month’s data in order to be able to analyze the measures and complete the calculations. The commenter asserted that this would impact the measures for a segment over time as it would not be comparing similar segments across the 4-year reporting timeframe.

The AASHTO, Illinois, Minnesota, and Georgia State DOTs, Florida Metropolitan Planning Organization Advisory Council, Hampton Roads Transportation Planning Organization, Ozarks Transportation Organization, and Denver Regional Council of Governments recommended that FHWA allow State DOTs and MPOs flexibility to establish reporting segments that best reflect the needs of an individual State, which may be longer than the proposed limit of 1/2 mile for urban areas and 10 miles for non-urban areas. For example, AASHTO and Florida Metropolitan Planning Organization Advisory Council said that the segments could be based on logical termini, such as intersecting NHS facilities or the start or end of an urbanized area. The AASHTO and Connecticut DOT asserted that the proposed maximum length of reporting segments (1/2 mile in urbanized areas, 10 miles in non-urbanized areas) for a reliability measure are not consistent with prevailing practices in calculating travel time reliability measures (e.g., SHRP 2 Reliability Program).



Specifically, New York State Association of Metropolitan Planning Organizations proposed that FHWA permit urban travel time segments up to 5 miles in length. Requesting to see FHWA's research behind the proposed reporting segment length caps, Oregon and Washington State DOTs recommended that FHWA revise proposed § 490.103(f) so as not to be misinterpreted as allowing longer groups of TMCs (one "reporting segment") if one of the TMCs within the group is longer than the threshold.

The Great Lakes Regional Transportation Operations Coalition and University of Wisconsin-Madison Traffic Operations and Safety Laboratory recommended that FHWA remove the option to aggregate segments if using the NPMRDS, arguing that it is unnecessary, would involve extra work, and could invite a sort of gerrymandering where poorly performing TMCs can be bundled with better TMCs so measures meet targets. The Minnesota and New Jersey State DOTs, NJTPA, Metropolitan Council, and Wichita Area Metropolitan Planning Organization requested a clarification on the treatment of segments that cross MPO and/or urbanized area boundaries. The NJTPA said that the proposed rule is unclear as to how reporting segments that cross MPO and/or urbanized area boundaries are to be handled. Moreover, it said that none of the measures that MPOs need to report at the MPO level mention how to handle reporting segments that cross an "MPO boundary."

The NJTPA also urged FHWA to revise the rule to allow one set of reporting segments for the freight measures and another set of reporting segments for the remaining measures, reasoning that the standard for locating TMC segment endpoints is not standardized across commercial vendors. According to this commenter, the proposed rule would effectively require that, if a State opts to use an equivalent data set, it would have to use the TMC definitions used by HERE, the vendor that provides the NPMRDS. In order to clarify the default reporting segment in the event that States and MPOs do not agree, AASHTO, Illinois DOT, and Connecticut DOT recommended that FHWA revise the definition of "reporting segment" to say that a reporting segment is the segment set forth in the NPMRDS data set provided by FHWA (or an alternative data set used by the State) unless the State and any applicable MPO determine otherwise. New York State Association of Metropolitan Planning Organizations also recommended that

the definition of "reporting segment" address the process of which agency defines reporting segments within the urbanized area or MPA, proposing that FHWA amend the proposed definition to state "the State and MPOs cooperatively define . . ." Oregon and Washington State DOTs requested clarification regarding what type of documentation will be adequate for demonstrating coordination between State DOTs and MPOs for establishing reporting segments.

The FHWA recognizes that changes in segment length can present challenges in metric calculation. Segment length changes in the NPMRDS can occur sometimes due to the provider splitting long segments or new roads/improvements necessitating changes in the segmentation. Although it will be difficult to lock in segment lengths for a full year, FHWA will work with the NPMRDS provider to limit segment changes and document any changes made. Also, the proposed Pooled Fund approach to processing/analysis could help alleviate this issue.

In regard to aggregation, although there remains an option to join travel time segments into Reporting Segments of longer lengths, State DOTs are not required to take this action. The FHWA has retained the option to allow State DOTs to relate Travel Time Segments to their own roadway segmentation and to ensure travel time data are used at a sufficiently detailed level to provide useful metric calculations. In response to several comments asking if segments in urban areas could be longer than 0.5 miles, in this final rule, FHWA has changed the maximum length for reporting segments to one mile in urban areas, unless an individual Travel Time Segment is longer.

The FHWA intends to develop guidance to assist State DOTs and MPOs in the processing of segments to calculate metrics. The final rule does not specify how segments that cross boundaries should contribute to the metric. It is anticipated that data processing guidance will recommend that segments should contribute to the metric only if the entire length of the segment is contained within the applicable area.

#### 9. NHS Coverage in the NPMRDS Data

The Great Lakes Regional Transportation Operations Coalition and University of Wisconsin-Madison Traffic and Safety Laboratory commented that NHS coverage in the NPMRDS changes with each static file change, which would alter the calculations. The commenter recommended that calculations be based

on only those TMCs that exist in all static file versions within a year.

The Illinois DOT commented that since NPMRDS TMC segments are not consistent lengths across months and years, it would be difficult to perform proper analysis because States would not be comparing similar segments across the 4-year reporting time frame. Ozarks Transportation Organization provided a similar comment and noted that the NPMRDS would need to be adjusted regularly in order to be used for performance measures and reporting.

The FHWA will work with the NPMRDS contractor to make sure the NHS updates are reflected in the NPMRDS travel time data as soon as is possible. There are inherent delays in providing data on a system that can change, and FHWA has addressed the issues in the rule by making certain requirements consistent throughout a reporting period. Comments received in the second performance measure rulemaking (pavement and bridge conditions) suggested that the impact of measure outcomes due to variations of NHS limits from year to year are not sufficient enough to warrant locking in one definitive NHS limit for a full performance period. This final rule follows the same approach.

#### 10. Travel Times

Several commenters expressed support for travel times of 15 minutes (or longer), being used for the travel time-based measures. The commenters asserted that this would lead to, among other benefits, fewer bins with no data, reduced data storage burden, less effort required for quality control and quality assurance, and greater utility for members of the public interested in the data. Commenters argued that the higher level of granularity available in data from 5-minute bins, which provides more precision but not necessarily greater accuracy, does not confer enough additional benefits to justify the extra burden they would impose. Other commenters stated that due to low traffic volumes there may not be any travel time recorded in many 5-minute segments.

The NARC commented that if FHWA were to follow its recommendation for processing data centrally, FHWA could then obtain the data in 5-minute (or even 1-minute) bins but provide them to States in 15-minute bins. The AASHTO expressed support for the use of 5-minute bins for national-level performance reporting but stated that data with higher temporal resolution (e.g., 1-minute bins) have benefits for other purposes such as research.

Southeast Michigan Council of Governments expressed concern that for data on freight movements, 5-minute bins may not contain enough data points to maintain the anonymity of individual trucks. The Maine DOT commented that 60-minute bins would be better suited to its needs due to the limited and seasonal nature of its congestion and reliability issues as a rural State with low population density.

The FHWA agrees with and appreciates the concerns raised by commenters on the challenges with using 5-minute temporal granularity in the calculation of travel time metrics. Using 15-minute time periods would significantly simplify data analysis in terms of the size of the data set; FHWA estimates that the data set would be reduced by approximately two-thirds. The FHWA received many comments noting the amount of missing data when using 5-minute time intervals. The FHWA conducted an analysis to compare the amount of missing data when using 5-minute time periods to 15-minute time periods and determined that, for the segments analyzed, switching to 15-minute time periods improved data completeness by 25 percent to 30 percent for non-Interstate NHS segments; the resulting NHPP reliability measures differed by no more than 5 percent for Interstate highways. In addition, individual segment level LOTTR values were nearly identical, with an average difference of less than 1 percent for all of the segments evaluated. The assessment showed the greatest difference for the PHED measure, which was likely due to the prevalence of missing data at the 5-minute interval. The FHWA recognizes that larger time intervals reduce the level of specificity and granularity, but believes that the benefits of a more complete data set will allow for more accurate measure calculations. The FHWA does encourage the use of more granular time intervals (1 to 5 minutes) to carry out segment level analysis to better identify strategies to address issues impacting roadway reliability and congestion, but this information is not required to be reported to FHWA.

#### 11. Alternative Data Sets

The AASHTO expressed support for FHWA's intent to make the NPMRDS available to State DOTs and MPOs for use in calculating performance measures and to allow States to use an alternate data set. Several State DOTs questioned FHWA's ability to continue to provide the NPRMDS data free of charge in the future raising concerns with the burden on State DOTs to acquire this data on their own if this

were to happen. Commenters also expressed concerns with the costs associated with the development of alternate data sets that would comply with the proposed travel time data requirements.

The NJTPA asked if equivalent travel time data sets can include data from different vendors or sources or both, as long as it satisfies FHWA requirements. For example, the commenter recommended that FHWA consider a "hybrid" or "fused" data set (such as the TRANSCOM "Data Fusion Engine" travel time data set) that includes travel times from various agency sensors (e.g., BlueTOAD sensors, toll transponder readers, Sensys pucks) as well as commercial probe data. Iowa DOT asked if the requirement that data "be populated with actual measured vehicle times and shall not be populated with travel times derived from imputed methods" eliminates any specific alternative data sources (e.g., INRIX) from consideration.

Several commenters requested detailed guidance on the approval process for using equivalent data sources in place of, or in conjunction with, the NPRMDS. In particular, the commenters asked what the approval process will look like, who will have the authority to grant the approval, how quickly the approval will be granted after a formal request is made, what information will be required for approval, what happens if FHWA does not approve the data set, and how frequently requests can be made by each State. The commenters also recommended that FHWA include in the final rule a time limit for such requests, stating that approval will be granted if no action is taken once the time limit expires. Rather than requiring State DOTs to get approval for alternate data sets, the Great Lakes Regional Transportation Operations Coalition and the University of Wisconsin-Madison Traffic Operations and Safety Laboratory suggested that it would be more efficient for a central entity (e.g., CATT Lab or TTI) to house and process travel time data, produce the metrics, and provide results to State DOTs and MPOs for use in target setting and reporting.

The Delaware Valley Regional Planning Commission, on behalf of the Partners Using Archived Operations Data, recommended that FHWA streamline the process to approve alternate data sets. Hampton Roads Transportation Planning Organization and the State DOTs of Virginia and Minnesota suggested that FHWA approve specific alternate data sets (such as INRIX and TomTom) rather

than requiring each State to request approval for these sources.

The FHWA believes that the use of the NPMRDS data set by all States and MPOs will promote national consistency among all of the measures. However, FHWA is willing to review commercially available travel time data sets to pre-approve those that are determined to be "equivalent" to the NPMRDS. The FHWA is not currently aware of any commercial data set that is "equivalent," but requests that if a State DOT or MPO believes that an alternative data set is "equivalent," then that State DOT or MPO should submit a request to FHWA. The FHWA appreciates that State DOTs and MPOs will need to know if a commercially available data set will be considered equivalent to the NPMRDS before financial resources are used to acquire data. Therefore, FHWA will consider alternative data set providers, on request by a State DOT or MPO, before their decision to use the data to meet the requirements of this final rule. If FHWA reviews a request and determines that the alternative data set is not "equivalent," then the State DOT or MPO must use the NPMRDS data set. Finally, FHWA retained the proposed regulation to use a single travel time data set (NPMRDS or equivalent) for all travel time derived metrics in this final rule. The FHWA believes that, as the metrics apply to the same roadway segments with the same traffic, it is important to use the same data set to calculate the metrics.

The FHWA intends to approve requests for alternate data sets in a timely manner such that the requested data set can be used by the State DOT beginning on January 1st of the year following the request. State DOTs should contact FHWA as soon as practical when considering alternate data sets to provide for sufficient time for the State DOT to acquire the data for use. The October 1st deadline is included in the final rule as the latest date the FHWA believes an alternate data set can be approved for use by the next calendar year. For clarification, in response to questioned raised by commenters, the final rule allows for alternate data sets to be combined with the NPMRDS in whole or in part to meet the travel time data requirements of this rule.

#### 12. Corridors

Several commenters expressed a preference for a corridor-based approach to evaluate system performance instead of a segment-based approach and system-wide performance measures. The New York State DOT requested that the final rule to focus on corridors,

particularly in urban areas where congestion is likely to occur, that are defined by States and MPOs in ways that are meaningful for State and regional planning. The Washington and Oregon DOTs use a corridor-based approach that they assert allows the State to manage systems based on important functions and characteristics that will be missed by simply having urban/non-urban measures system-wide.

As part of an internal evaluation of the performance measures, Purdue University compared segment-based results with a corridor-based approach. According to this commenter, the corridor-based results were consistent with the segment-based analysis in that Interstate routes tended to be more reliable, but the routes for which there were numerous individual segments with a number of high LOTTR or PHTTR values did not exhibit these high values in a corridor-based analysis.

Oregon Metro Council and the Joint Policy Advisory Committee on Transportation urged FHWA to develop an integrated multimodal corridor approach to measuring person throughput and congestion that includes HOV lanes, public transit, and biking and walking facilities.

The California Association of Councils of Government (CALCOG) and others commented that freight measures specifically should be focused at the corridor level.

The FHWA recognizes that many State DOTs and MPOs use “trips” as the basis for reliability determination and fully supports that approach. However, that approach requires a working knowledge of how the system operates at a corridor level. Determining the length of analysis for these trips is not something that can easily be done in a nationally-consistent way. Instead, FHWA determined that looking at segment level performance was a satisfactory way to provide a consistent approach to measure system performance and traffic congestion in this rule. While State DOTs and MPOs are only required to assess progress on full system performance in this rule, State DOTs and MPOs may use the metrics to assess corridor-specific performance and use corridor-specific information to monitor progress, analyze trends, and establish targets.

### 13. Weather and Construction Impacts

Several commenters expressed concern that extraordinary events such as non-recurring inclement weather, prolonged construction, large gatherings, and insufficient funding will make target setting difficult and will

impede agencies’ ability to achieve successful performance. Commenters requested FHWA take these events into account in the final rule.

The AASHTO recommended that FHWA allow State DOTs and MPOs the flexibility to exclude from calculation and targets roadway segments for periods of inclement weather conditions using a consistent approach and data (e.g., National Weather Service reports and data archives).

The Illinois DOT suggested reports should be based on the number of days and/or center-line miles of facilities that are under construction or impacted by weather in order to keep the data set whole. The NARC suggested that there should be an opportunity for MPOs and States to explain targets and results as part of the reporting protocol to address unique circumstances.

The Mid-Ohio Planning Commission suggested including all extraordinary events, as all entities will undertake construction, and this measure would remain consistent with the bridge and pavement rule, which does not change factors for areas with more inclement weather. The Great Lakes Regional Transportation Operations Coalition and the University of Wisconsin-Madison Traffic Operations and Safety Laboratory reasoned that extraordinary events are in the far “right tail” of travel time distributions and would not affect the 80th percentile travel time.

The FHWA believes that reliability measures should include travel times during weather- and construction-related events to ensure that the measure reflects the efforts by transportation agencies to maintain and improve roadway operations. The FHWA further believes that the 80th percentile travel time used in the calculation of the NHPP reliability metric will exclude a majority of the longest travel times that occur as a result of extreme congestion events. The variability in travel time resulting from construction operations and other events that impact traffic flow are expected to be included in the measure as operational improvements and management should be able to help alleviate impacts from these events. The FHWA modified the NHPP reliability measure to remove the threshold that would determine if a segment is providing for reliable travel. The FHWA believes that this change will minimize the impact that extreme weather events could have on the metric and measure outcome. The FHWA has also added a provision for all the travel time derived measures that allows removal of travel times from the metric calculations when the roadway is closed.

The FHWA has retained the proposed provisions in section 490.109(e)(5) that consider extenuating circumstances, allowing State DOTs to explain the factors they considered when establishing targets and the circumstances that may have impacted their ability to make progress in achieving those targets. The FHWA believes that these provisions will allow State DOTs to document the impact of extreme weather events on performance expectations and their ability to manage system performance.

### 14. Holidays

The FHWA received several comments on whether holidays should be excluded from the travel time-based measures and requested that these exclusions be consistent across all travel time-based measures.

The AMPO pointed out that there are issues with consistency in calendar coverage in the proposed rule; holidays were excluded in the PHTTR metric, but not in the LOTTR metric. The commenter expressed concern that these inconsistencies, if not clearly justified, have the potential to add confusion and increase the burden in implementing these measures. A consistent set of time periods would be easier to understand.

Puget Sound Regional Council proposed that a consistent set of weekday time periods that excludes holidays would be easiest to understand.

The AASHTO, echoed by New Jersey, Missouri, Washington DOTs and others, requested days to be grouped similarly (non-holiday weekdays, weekends, and holidays) and for any excluded holidays to be specified in the final rule. They also asked for guidance on how to manage holidays that fall on weekends and are observed on a weekday.

The FHWA agrees with commenters that the burden required to identify and exclude holidays from the metric calculations is not warranted. The FHWA compared measure results with the inclusion and exclusion of holidays in the calculation. The analysis indicates that the inclusion of holidays in the travel time-based measures did not have a statistically significant effect on the annual metric and measure calculations. For this reason, the rule now requires that holidays be included when determining the metric.

### 15. Annual Reporting of Travel Time Metrics

The Oregon and Washington State DOTs commented that annual reporting of LOTTR and PHTTR metrics is too burdensome.



The FHWA recognizes the burden associated with the calculation of travel time based metrics, particularly in the first years of implementation. However, FHWA believes that through the development of standard processing routines the metrics can be calculated with a reduced burden. The proposed pooled fund effort should help alleviate the burden of annual reporting while providing consistent performance monitoring data for use in all performance management activities.

#### 16. Establishing Performance Targets

The Atlanta Regional Commission and the Florida Metropolitan Planning Advisory Council stated that they appreciate the flexibility provided to State DOTs and MPOs regarding the establishment of improving, constant, or declining targets and they asked that this implementation philosophy be carried forward to the final rule. Several commenters<sup>9</sup> recommended that specific regulatory language be included in the final rule to confirm that State DOTs and MPOs are allowed to establish improving, constant, or declining targets.

The FHWA believes that State DOTs and MPOs have the discretion to establish their targets. The MAP-21 does not provide FHWA the authority to approve or reject State DOT or MPO established targets. The FHWA believes that this rule does not impair the ability of State DOTs and MPOs to establish constant or declining targets. Thus, FHWA believes that specific language describing potential target level scenarios in the regulatory language is unnecessary.

#### 17. Target Establishment Frequency

Several commenters<sup>10</sup> stated that 2-year and 4-year timeframe will not reveal any meaningful progress toward targets or strategies implemented in that those timeframes. Others<sup>11</sup> expressed concerns that “over-emphasis on short-term over longer term targets may present an unintended obstacle to developing innovative, sustainable, and comprehensive solutions or to undertaking larger projects that can take many years to plan and implement.” The New York State Association of MPOs stated that the biennial reporting would give a snapshot of performance, but would also not reflect the results of

projects that have not been in place long enough for their impact to be measured. This commenter suggested that it may be useful to include in the report a list of projects implemented since the previous reports. The Pennsylvania DOT, COMPASS, and DVRPC recommended a broader time-horizon in the final rule. The AASHTO and several State DOTs<sup>12</sup> recommended providing State DOTs and MPOs the opportunity to voluntarily set long-term targets, not just 2- and 4-year targets, and to do so completely outside of the Federal regulatory framework. The Mid-Ohio Regional Planning Commission (MORPC), CMAP, and Portland Metropolitan Area MPO commented that targets should be established as part of each MPO’s Metropolitan Transportation Plan development or update cycle.

As stated in the NPRM, established targets (2-year and 4-year) would need to be considered as interim conditions/performance levels that lead toward the accomplishment of longer-term performance expectations in State DOT long-range statewide transportation plans and NHS asset management plans. In order to avoid confusion, FHWA used the term “longer-term performance expectations” in the NPRM to distinguish between longer-term targets and the interim anticipated condition/performance (*i.e.*, 2-year and 4-year targets) toward those longer-term performance expectations. The FHWA recognizes the importance of using a longer time horizon for planning and programming projects that considers and evaluates temporal tradeoffs between feasible improvements for more efficient and effective investment decisions. The FHWA strongly recommends that State DOTs and MPOs consider longer time horizons, which look beyond 4 years (*i.e.*, multiple performance periods), for planning and programming of projects, so identification and selection of those projects is guided by the longer term performance expectations. The purpose of the performance period is to measure and evaluate condition/performance, which should not be assumed to be a “planning, programming, project delivery, data collection, data reporting” cycle of individual improvement projects or a program of projects. Thus, the performance period and long-range planning (LRP) cycles look at different time periods and do not have to be aligned to be effective. Therefore, FHWA retains the proposed language in § 490.105(e)(4) and (5) in this final rule.

#### 18. Target Adjustment Schedule

The Washington State and Oregon DOTs, AMPO, and Fairbanks Metro Area Transit System supported the proposed approach for allowing State DOTs to adjust an established 4-year target in the Mid Performance Period Progress Report. On the other hand, New York State Association of MPOs, State DOTs of South Dakota, Connecticut, Utah, and Alaska, and AASHTO recommended the flexibility to be able to adjust targets annually, if critical assumptions underlying performance targets have changed sufficiently to affect target values.

The FHWA believes that MAP-21 gives FHWA the discretion to establish requirements for targets. The FHWA has determined that State DOTs or MPOs may establish any target to satisfy the requirements for the performance management measures. The FHWA believes State DOTs have the authority and flexibility to establish targets for the performance measures. However, FHWA does not believe MAP-21 provides State DOTs and MPOs the authority to adjust or revise targets at any time at their discretion. The FHWA believes that 23 U.S.C. 150 provides FHWA the authority to establish requirements for targets, and that some requirements must be established so that accountability and transparency are instilled in the performance management process. As discussed in the NPRM, the FAST Act amended the number of determinations<sup>13</sup> in MAP-21 from “two consecutive determinations” to each determination, that FHWA will make on a State DOT target (determined that State DOT has not made significant progress towards achieving its target) before that State DOT is required to take action.<sup>14</sup> In response to this change, FHWA felt that an approach is necessary to provide State DOTs the same opportunity to make significant progress for 4-year targets as for the 2-year targets. The FHWA believes that 4-year target adjustment through the Mid Performance Period Progress Report will provide that opportunity because the actual time horizon (the duration between the target reporting date and the date which a target is established for) for State DOTs to consider in establishing 2-year targets and adjusting 4-year targets will be the same. For example, the duration between 2-year target reporting (via Baseline Performance Period Report) and the

<sup>9</sup> AASHTO, Alaska, Arkansas, Connecticut, Florida, Idaho, Illinois, Montana, Missouri, North Dakota, South Dakota, Wyoming DOTs, and National Association of Regional Councils.

<sup>10</sup> COMPASS, New York State, Pennsylvania DOT, DVRPC, and New York State Association of MPOs.

<sup>11</sup> AMPO, New Jersey DOT, and NJTPA.

<sup>12</sup> Alaska, Connecticut, and Illinois.

<sup>13</sup> 23 U.S.C. 119(f)(7).

<sup>14</sup> 23 U.S.C. 119(f)(7)—Require to provide a description of the actions the State will undertake to achieve the targets in its biennial performance report.

midpoint of a performance period (*i.e.*, the date which 2-year targets are established for) will be the same as the duration between adjusted 4-year target reporting (via Mid Performance Period Progress Report) and the end of a performance period (*i.e.*, the date which 4-year targets are established for). In response to the comments suggesting annual target adjustment, the State Biennial Performance Reports has the appearance that State DOTs would consider 2-year time horizon for establishing a 2-year target or adjusting a 4-year target, as the biennial reporting frequency may suggest. However, as discussed above, the actual time horizon for establishing 2-year targets and adjusting 4-year targets that State DOTs have to consider is much shorter than 2 years. The FHWA feels that this frequency of adjustment allows a State DOT to address changes they could not have foreseen in the initial establishment of 4-year targets while still maintaining a sufficient level of control in the administrative procedure necessary to carry out these program requirements in an equitable manner. For this reason, FHWA retains the language in section 490.105(e)(6), as proposed in the NPRM.

#### 19. Ownership & Applicability of Measures/Targets

The South Jersey Transportation Planning Organization, Coalition of Great Lakes Regional Transportation Operations, COMPASS, and AMPO stated that State DOTs and the MPOs do not have any direct control over the NHS.

The statutory language in MAP-21 and the FAST Act apply the performance management requirements (23 U.S.C. 150), NHPP (23 U.S.C. 119), and CMAQ (23 U.S.C. 149) to the NHS/ Interstate System and not to “State DOT owned or operated” Interstate System or “State DOT owned or operated NHS.” The MAP-21 does not provide unique definitions to the terms “State” or “MPO” for purposes of 23 U.S.C. 150, 119, 167, and 149, and thus these terms have the same meaning as defined elsewhere in Title 23 U.S.C. Accordingly, FHWA retains the language in section 490.105(d) which requires State DOTs and MPOs to establish targets for the entire NHS and Interstate System for the entire geographical area within the State or metropolitan planning area, regardless of ownership.

#### 20. Fiscal or Calendar Year Based Performance Periods

The Georgia DOT commented that some reporting requirements are based

on the Federal fiscal year and others on a calendar year. The commenter said that this difference would create additional work for State DOTs and suggested one consistent reporting date, or that FHWA provide flexibility to align the Federal fiscal year or calendar year reporting dates. The Portland Metropolitan Area MPO and the Denver Regional Council of Governments commented that Federal fiscal year or calendar year reporting dates for different measures are inconsistent and confusing. On the other hand, State DOTs of Washington State, Connecticut, and Oregon, AASHTO, and Puget Sound Regional Council MPO supported the metric data requirements for CMAQ on-road mobile source emissions measures based on Federal fiscal year and all travel time related measures based on calendar years. The Puget Sound Regional Council added that utilizing the existing reporting framework for CMAQ projects simplifies the process for MPOs.

In the NPRM, FHWA stated that the CMAQ on-road mobile source emissions measure establishment would rely on the existing processes State DOTs use to manage, track, and report projects as part of the CMAQ program. For this reason, FHWA elected to base the performance period for the on-road mobile source emissions measure on the Federal fiscal year to align with Federal fiscal year based reporting of the estimated emission reductions by State DOTs for CMAQ-funded projects through the CMAQ Public Access System. The FHWA believes that this approach provides the simplest and most effective means to implement the MAP-21 performance requirements for on-road mobile source emissions. As for all other measures (including the CMAQ traffic condition measures), calendar year-based data collection and reporting requirements specified in subparts E, F, and G are aligned with Calendar Year-based performance period. For these reasons, FHWA retains the language in section 490.105(e)(4)(i) unchanged. Although the performance period for the on-road mobile source emissions measure is different from all other measures, the reporting dates for condition/performance, targets, progress, etc. required in section 490.107 for the on-road mobile source emissions measure are the same as all other measures in this rule.

#### 21. Boundaries

The Denver Regional Council of Governments commented that the geographic area application for each measure is confusing (urbanized area vs. transportation management area vs.

metropolitan planning area) particularly in light of DOT’s NPRM on “MPO Coordination.”<sup>15</sup> The Connecticut and Arkansas DOTs commented that a greater consistency in boundaries is needed throughout this rule. The Arkansas DOT recommended a simpler, consistent boundary source be adopted in conjunction with State DOTs and MPOs, particularly given the uncertainty surrounding the definition of Metropolitan Planning Area in the context of the Metropolitan Planning Organization Coordination NPRM. The DOTs of Connecticut, Arkansas, and Maryland and AASHTO stated that, “the urbanized area geography is not well understood and the specific use of it in calculating the congestion metric involves a significant learning curve that will take time to better understand.” The National Capital Region Planning Commission stated that the urbanized area boundary determination process of the Census Bureau is not well understood and importantly does not appear to be based on transportation and mobility considerations within the urbanized area. The commenter added that the Census urbanized area does not align with jurisdictional boundaries, which in most places is where preliminary transportation project planning and programming decisions are made. Finally, this commenter said that the basic unit used for developing urbanized areas, census blocks, differs from the basic unit used by MPOs, Transportation Analysis Zones.

The NJTPA requested a clarification on the treatment of segments that cross MPO and/or urbanized area boundaries. The commenter said that the proposed rule is unclear as to how reporting segments that cross MPO and/or urbanized area boundaries are to be handled. Moreover, the commenter said that none of the measures that MPOs need to report at the MPO level mention how to handle reporting segments that cross an MPO boundary.

The FHWA clarifies that only the CMAQ traffic congestion measures in subpart G are applied to applicable<sup>16</sup> urbanized areas for State DOTs and MPOs. All measures in other subparts in this rule are applied to State geographic

<sup>15</sup> NPRM on “Metropolitan Planning Organization Coordination and Planning Area Reform”, 81 FR 41473 (June 27, 2016).

<sup>16</sup> Urbanized areas with a population over one million for the first performance period and over 200,000 for the second and all other performance periods, that are, in all or part, designated as nonattainment or maintenance areas for ozone (O<sub>3</sub>), carbon monoxide (CO), or particulate matter (PM<sub>10</sub> and PM<sub>2.5</sub>) National Ambient Air Quality Standards (NAAQS) discussed in more detail under Section V Subpart G.



boundaries for State DOTs and metropolitan planning area boundaries for MPOs. The FHWA made the exceptions for traffic congestion measures because traffic congestion is more relevant in urbanized areas. Because the State geographic boundaries and the metropolitan planning area boundaries may include both urban and rural areas (and in different proportions), FHWA believes that the varying proportions of rural area (or road network in rural areas) would impact the statewide or metropolitan planning area -wide measures differently across the States and metropolitan planning areas.

As a result, FHWA is applying the CMAQ traffic congestion measures to the areas selected based on uniform and consistent criteria, such as the U.S. Census Bureau in designating urbanized areas. The FHWA understands that urbanized areas may not be the unit of area for transportation project planning and programming decisions for some agencies. However, focusing on traffic congestion in urbanized areas will allow for the opportunity to significantly reduce traffic congestion on the NHS across the nation while reducing the burden for the State DOTs and MPOs to implement the traffic congestion measures in non-urbanized areas. The FHWA disagrees with the comments from DOTs of Connecticut, Arkansas, and Maryland and AASHTO stating that “the urbanized area geography is not well understood.” The FHWA believes that State DOTs are well aware of a need for consistency or geographic continuity in urbanized area boundaries for transportation planning purposes through FHWA issued guidance.<sup>17</sup> The FHWA believes that State DOTs’ detailed understanding of urbanized areas in planning is exhibited through State DOT reported data to HPMS.<sup>18</sup> For this reason, FHWA retains sections 490.105(d)(2) and 490.703 for the urbanized areas as the scope of traffic congestion measures and their performance targets.

## 22. Unified Targets

The AMPO commented that coordination across MPO boundaries is an important facet of the MPO planning process, but it is unclear that requiring single values and targets for entire (large) urbanized areas adds value. The commenter added that the proposed

unified target for an urbanized area adds significantly to the reporting complexity and may confuse interpretation of results. The AMPO and Kentucky DOT expressed concern that State DOTs and MPOs may be reluctant to adopt targets for areas outside of their control. The Oregon, Washington State, and Delaware DOTs expressed concerns about potential “time-intensive coordination requirements” and the complexity of multi-agency coordination associated with establishing a unified urbanized target, a concern echoed by the Connecticut DOT and the DVRPC. The Chicago Metropolitan Agency for Planning (CMAP) commented that, “it is an inappropriate enlargement of the Federal role to require the establishment of identical performance targets in separate States . . . nor is the mechanism by which the States would coordinate to establish identical targets explained in the NPRM.” The commenter added that the regulation would lead to a lowest common denominator approach to target setting. Other commenters agreed that the NPRM did not address how to resolve differences in target setting.

The Mid-America Regional Council suggested that FHWA give this particular issue additional consideration to determine how to best facilitate agreement between parties where such agreement is required and integrate this thinking into the final rule. Several commenters recommended that measure applicability be limited to “Metropolitan Planning Organization boundaries, or limit the reporting areas and targets to urbanized areas that fall within an MPO and/or a State.”

The FHWA believes that closer coordination among all entities in an urbanized area is necessary because traffic congestion within each entity’s geographic boundary urbanized area impacts the performance of the surrounding entities. A single, unified urbanized area target will foster a shared vision among State DOTs and MPOs of expectations for future condition/performance of the entire urbanized area and will ensure a jointly-owned target establishment process. More importantly, because the driving public does not concern itself with State or metropolitan planning area boundaries when it comes to traffic congestion, unified targets are crucial to communicate regarding traffic congestion for the entire urbanized area. The FHWA disagrees with CMAP’s comment that this requirement is “an inappropriate enlargement of the Federal role.” A single, unified urbanized area target aligns with 23

U.S.C. 134(h)(2)(B)(i)(II) and 23 U.S.C. 135(d)(2)(B)(i)(II), which require State DOTs and MPOs to coordinate in establishing consistent targets, to the maximum extent practicable.

Because of the reasons above, FHWA retains the language proposed in NPRM § 490.105(d)(2), (e)(8)(iii)(B), and (f)(5)(iii)(B). The FHWA recognizes that State DOTs and MPOs will need more time to coordinate in the target establishment process, so FHWA provides a phase-in of this requirement in § 490.105(e)(8)(vi) and (f)(5)(vi), in the final rule, for the PHED measure in section 490.707(a).

## 23. CMAQ Measure Applicability

The Florida Metropolitan Planning Advisory Council commented that those States in attainment need to remain exempt from traffic congestion measures and targets. The NJTPA commented that the traffic congestion measure applicability determination approach described in § 490.105(e)(8)(i), (e)(8)(ii), (f)(5)(i), and (f)(5)(ii) may cause problems for a State DOT or MPO with a small amount of urbanized area NHS roadways within their boundaries. The commenter recommended that FHWA consider a minimum length of urbanized area NHS roadway for the measure applicability.

The FHWA has emphasized a need for close coordination among all entities in an urbanized area because the traffic congestion within each entity’s geographic urbanized area boundary impacts the performance of the surrounding entities in that urbanized area. The absence of any one of the surrounding entities in implementing traffic congestion measures will hinder establishing an effective and meaningful performance target for that urbanized area. For this reason, FHWA retains the language, as proposed in the NPRM, on the criteria for State DOT traffic congestion measure applicability in § 490.105(e)(8)(i) and (ii).

The FHWA concluded that regardless of the NHS miles within an entity’s geographic urbanized area boundary, the traffic congestion on those miles of NHS could impact the traffic congestion in the broader area. The FHWA considered a minimum length of NHS within an entity’s geographic urbanized area boundary as a threshold in the applicability determination, but concluded that such an approach would be arbitrary. The FHWA thus retains the methodology and approach proposed in the NPRM for the traffic congestion measure applicability determination described in § 490.105(e)(8)(i), (e)(8)(ii), (f)(5)(i), and (f)(5)(ii).

<sup>17</sup> Highway Functional Classification Concepts, Criteria and Procedures (FHWA): [https://www.fhwa.dot.gov/planning/processes/statewide/related/highway\\_functional\\_classifications/section06.cfm](https://www.fhwa.dot.gov/planning/processes/statewide/related/highway_functional_classifications/section06.cfm).

<sup>18</sup> “Urban Code” Data Item in HPMS sections data.



Commenters also requested flexibility to revise applicability if nonattainment or maintenance designations change during the 4-year performance period. The Georgia DOT recommended making the determination of which State DOT and MPOs are subject to CMAQ measures 1 year in advance of the State DOT Baseline Performance Period Report to provide some assurance and to avoid unnecessary resource expenditure based on assumptions.

The FHWA agrees with the comment from Georgia DOT that applicability determination should be made earlier. The FHWA revises in the final rule<sup>19</sup> the timing of determining which State DOTs and MPOs are required to implement CMAQ traffic congestion measures in § 490.707(a) and (b) and CMAQ on-road mobile source emissions measure in section 490.807. The applicability determination for all CMAQ measures will be made 1 year before when the State DOT Baseline Performance Period Report.

The FHWA also agrees with the commenters on the flexibility to revise applicability if nonattainment or maintenance designations change during the 4-year performance period. As a result, FHWA has revised the rule to make section 490.809(c) inapplicable if U.S. Environmental Protection Agency changes to the designations become effective 1 year before the State DOT Mid Performance Period Progress Report is due to FHWA. To be consistent with this change, FHWA revised § 490.105(e)(8)(iii)(F), (e)(8)(v), (f)(5)(iii)(F), and (f)(5)(v) for the traffic congestion measures, and § 490.105(e)(9)(v), (e)(9)(viii), and (f)(6)(v) for the on-road mobile source emissions measure.

#### 24. Due Date for Initial Performance Reports

Many commenters explained that they would not have adequate time to complete a comprehensive Initial State Performance Report by the October 2016 deadline and urged FHWA to delay or change the due date.

The FHWA issued guidance<sup>20</sup> on the Initial State Performance Report on August 31, 2016, to provide State DOTs the opportunity to comply with the statutory deadline for the first performance reporting under 23 U.S.C. 150(e). In this guidance, FHWA

recognized that State DOTs would not have established targets for the measures in this rule. The FHWA simplified the reporting requirement by only requiring a description of the planned processes for target establishment and coordination with relevant MPOs and other agencies that will occur in the selection of targets. Therefore, FHWA removes the Initial State Performance Report requirement in this final rule.

#### 25. MPO Reporting

The AASHTO and Connecticut DOT requested that individual MPOs submit their plans directly to FHWA, and the Denver Regional Council of Governments suggested that, “it may be simpler for State DOTs to compile one statewide version . . . with input from the State’s MPOs.”

The FHWA maintained that the MPO is responsible for creating the plan and submitting it to the State DOT in a timely manner. The rule does not require more than one State DOT to attach CMAQ Performance Plans for MPOs whose metropolitan planning area crosses a State boundary. The FHWA believes that this minimizes the reporting burden for both State DOTs and MPOs, since a State DOT simply needs to receive the plan from the MPO and attach it to its biennial report; the State DOT is not required to create or modify the plan. Adding a requirement for MPOs to report to FHWA would be more burdensome, as most MPOs do not currently report to FHWA; under the CMAQ program, State DOTs report on projects for MPOs. For these reasons, FHWA retained the requirement in section 490.107(c)(3) for MPOs to submit their CMAQ performance plans to FHWA through the State DOT.

#### 26. Optional Target Reporting

The AASHTO and several State DOTs opposed to the requirement for State DOTs to report optional (additional—urbanized/non-urbanized area) targets to FHWA in FHWA-approved formats. They said that this requirement would force State DOTs to find a way to conduct additional planning without using words such as “target,” “measure,” or “performance management” to avoid FHWA’s reporting, recordkeeping, and other regulatory requirements. These commenters urged FHWA to remove the language requiring State DOTs to report boundaries, progress, etc. in section 490.105(e)(3).

The FHWA proposed that targets established pursuant to 23 U.S.C. 150(d)(2) (authorizing State DOTs to establish different performance targets

for urbanized and rural areas) be considered “optional” or voluntary targets for State DOTs. The proposal would allow State DOTs to establish a target for any combination of urbanized areas and provided that FHWA would not assess the progress achieved for any such additional or optional targets. The FHWA interprets 23 U.S.C. 150(e)(3) to require that State DOTs report the additional targets and their progress in achieving these targets in their Biennial Performance Reports. As a result, FHWA did not modify §§ 490.105(e)(3) and 490.107(b)(1)(ii)(A), (b)(2)(ii)(B), and (b)(3)(ii)(B).

#### 27. Significant Progress Determination

The Oregon DOT suggested adding “planned transportation corridor improvements” to the list of extenuating circumstances for not achieving significant progress in section 490.109(e)(5)(i). Several commenters suggested that “insufficient funding” be added to the list. The Michigan DOT suggested adding the impact of economy on VMT because they said that transportation agencies have limited ability to influence the VMT changes due to economy on traffic congestion.

The FHWA understands that there are many external factors that could impact the condition/performance and the State DOT’s ability to make significant progress, including lack of funding. However, FHWA believes that the frequency of target establishment and State DOTs’ ability to adjust 4-year targets at the mid-point of a performance period creates a relatively short forecast window that should allow State DOTs to consider the impacts of funding shortfalls and uncertainty (*e.g.*, lack of funding for investment, cost escalation) in initial targets and any subsequent adjustments. Additionally, State DOTs must consider uncertainties 2 years in advance in the State Biennial Performance Report. As discussed in section 490.105(e)(6), the actual duration that State DOTs have to consider uncertainties is shorter than 2 years.

The FHWA does not intend to use the significant progress determination process to be punitive or to encourage State DOTs to establish easy-to-achieve targets. Establishing targets and assessing progress is intended to encourage State DOTs and MPOs to establish data-supported targets that consider anticipated resources and potential uncertainties and to provide data-supported explanations of condition/performance changes. If a State DOT does not make significant progress because of lack of funding or other reasons, FHWA expects that State

<sup>19</sup> Section 490.105(e)(8)(iii)(D) through (F), (e)(8)(iv), (f)(5)(iii)(D) through (F) and (f)(5)(iv) for traffic congestion measures and § 490.105(e)(9)(v) and (f)(5)(v) for on-road mobile source emissions measure.

<sup>20</sup> FHWA Guidance: Initial State Performance Report: <http://www.fhwa.dot.gov/tpm/guidance/160831.cfm>.

DOT will provide data-supported explanations for not achieving significant progress. Transportation performance management is not just about making significant progress. It is about effectively communicating to Congress and the public how the “planned transportation corridor improvements,” how the absence of “sufficient funding” and other circumstances are impacting the condition/performance of the transportation network. Moreover, FHWA believes the determination process must be meaningful and bring accountability to the program as MAP-21 and FAST Act intended. For these reasons, FHWA retains the language in section 490.105(e)(5)(i), as proposed in the NPRM.

### C. Subpart E—National Performance Management Measures for the NHPP System Performance

#### 1. Establishment of Greenhouse Gas (GHG) Emissions Measure

In the preamble to the NPRM, FHWA sought public comment on whether and how to establish a CO<sub>2</sub> emissions performance measure in the final rule. The FHWA asked a series of questions regarding the design and implementation of a GHG emissions measure and whether one should be established. The FHWA stated that if GHG emissions were to be measured, FHWA believed the best measure would be the total annual tons of CO<sub>2</sub> emissions from all on-road mobile sources. Finally, FHWA cited relevant research, including the FHWA publication, *A Performance-Based Approach to Addressing Greenhouse Gas Emissions through Transportation Planning*, published in December 2013 (available in the docket for this rulemaking).

The FHWA received thousands of comments on whether or not to establish such a measure and how a measure should be designed and implemented. Supporting comments came from 91,695 citizens, 9 State DOTs, 24 MPOs, 19 U.S. Senators, 48 Members of the U.S. House of Representatives, over 100 cities, numerous local officials, over 100 businesses, and over 100 public interest, non-profit and advocacy organizations. Some State DOTs and MPOs already use GHG emissions as a performance measure.

Comments against a GHG emissions performance measure were submitted by 10 State DOTs, 2 MPOs, 5 U.S. Senators, 31 Members of the U.S. House of Representatives, and 27 transportation and infrastructure industry associations.

Additionally, nine State DOTs and three industry associations requested that FHWA not establish any performance measures not explicitly stated in legislation.

A number of the commenters in both groups addressed whether FHWA has the legal authority to establish a GHG measure and whether such measure could be established in this rulemaking.

After careful consideration of the comments received, FHWA decided to establish a GHG emissions performance measure in this rule to measure environmental performance in accordance with 23 U.S.C. 150(c)(3). Doing so will incorporate an important environmental aspect of system performance into the set of national performance measures, be responsive to public comments, improve transparency, and support the national transportation goal of environmental sustainability in the Federal-aid Highway Program and the national performance management program established in 23 U.S.C. 150. As highlighted in FHWA’s 2013 Conditions and Performance Report<sup>21</sup> and its publication, *A Performance-Based Approach to Addressing Greenhouse Gas Emissions through Transportation Planning*,<sup>22</sup> there are two main types of climate change risk affecting transportation infrastructure: Continued emissions of GHGs, such as CO<sub>2</sub>, that adversely affect the atmosphere, leading to climate change effects, and threats to the transportation system posed by climate change impacts (e.g., damaged or flooded facilities).<sup>23</sup> In other words,

<sup>21</sup> FHWA 2013 Conditions and Performance Report (PDF Version), “Advancing Environmental Sustainability” at 5–6 through 5–7. <https://www.fhwa.dot.gov/policy/2013cpr/pdfs.cfm>.

<sup>22</sup> *A Performance-Based Approach to Addressing Greenhouse Gas Emissions through Transportation Planning*, FHWA (December 2013) at iii–iv. [https://www.fhwa.dot.gov/environment/climate\\_change/mitigation/publications/ghg\\_planning/index.cfm](https://www.fhwa.dot.gov/environment/climate_change/mitigation/publications/ghg_planning/index.cfm).

<sup>23</sup> Extreme weather and other impacts related to GHG emissions, such as sea level rise, can harm, disrupt, and damage transportation systems, particularly through flooding, resulting in costly disruptions. For discussions of the potential disruptive effects of climate change on the transportation system, see also *Impacts of Climate Change and Variability on Transportation Systems and Infrastructure: The Gulf Coast Phase 2, Task 3.2 Engineering Assessments of Climate Change Impacts and Adaptation Measures* (FHWA and U.S. DOT Climate Change Center) (August 2014) at 273 (available as of September 14, 2016, at [http://www.fhwa.dot.gov/environment/climate\\_change/adaptation/ongoing\\_and\\_current\\_research/gulf\\_coast\\_study/phase2\\_task3/task\\_3.2/task2phase3.pdf](http://www.fhwa.dot.gov/environment/climate_change/adaptation/ongoing_and_current_research/gulf_coast_study/phase2_task3/task_3.2/task2phase3.pdf)); and *Hampton Roads Climate Impact Quantification Initiative, Baseline Assessment of the Transportation Assets and Overview of Economic Analyses Useful in Quantifying Impacts*, U.S. DOT (September 13, 2016) (available as of November 1, 2016 at [http://ntl.bts.gov/lib/60000/60100/60161/Hampton\\_Roads\\_Climate\\_Impact\\_Initiative.pdf](http://ntl.bts.gov/lib/60000/60100/60161/Hampton_Roads_Climate_Impact_Initiative.pdf)).

the transportation system both contributes to climate change and suffers from the impacts of climate change (e.g., flooding, sea level rise). Reducing GHG emissions from the U.S. transportation sector will reduce the sector’s impact on climate change, promote environmental sustainability, and help to protect the NHS from damage caused by climate change.<sup>24</sup>

The GHG performance measure established in this rule is the same measure discussed in the NPRM: Total annual tons of CO<sub>2</sub> emissions from all on-road mobile sources. The FHWA designed the measure in a manner that uses existing data sources and minimizes burden on transportation agencies. Because FHWA is establishing the measure under 23 U.S.C. 150(c)(3), it applies to the NHS in all States and metropolitan planning areas. State DOTs will calculate the measure by multiplying motor fuel sales volumes already reported to FHWA by FHWA-supplied emissions factors of CO<sub>2</sub> per gallon of fuel and percentage VMT on the NHS.

A discussion of legal comments received and a synopsis of the comments and responses on questions FHWA posed in the NPRM follow.

#### Legal Questions

##### Authority To Establish a GHG Measure

A number of commenters supported FHWA’s legal authority to adopt a GHG performance measure in this rulemaking. Commenters pointed to the language in 23 U.S.C. 150(a) as evidence that performance management is not limited to the performance measures listed in 23 U.S.C. 150(c), but rather is intended to focus on achieving the national goals in 23 U.S.C. 150(b). Commenters cited the national goal of environmental sustainability in 23 U.S.C. 150(b)(6) in supporting FHWA’s legal authority. That provision states “[i]t is in the interest of the United States to focus the Federal-aid highway program on the following national goals: \* \* \* (6) Environmental sustainability.—To enhance the performance of the transportation system while protecting and enhancing the natural environment.” Several commenters stated a GHG performance measure is within the statutory authorization of MAP-21, including the performance measure provision for on-

<sup>24</sup> See, e.g., discussion in Section III(A) of CEQ’s *Final Guidance for Federal Departments and Agencies on Consideration of Greenhouse Gas Emissions and the Effects of Climate Change in National Environmental Policy Act Reviews* (August 1, 2016). Available as of September 14, 2016, at <https://www.fhwa.dot.gov/map21/guidance/guidecmaq.cfm>.



road mobile source emissions under the CMAQ program (23 U.S.C. 150(c)(5)(B)). The commenters did not view the language as limited to the three pollutants specified in the CMAQ statute (*i.e.*, ozone, PM, and CO).

Some commenters pointed out that establishing a GHG performance measure would be consistent with other MAP-21 rulemakings. In particular, six members of the Senate Committee on Environment and Public Works pointed to the consistency between a GHG performance measure and provisions in FHWA's 23 U.S.C. 119(e) asset management rulemaking relating to current and future environmental conditions, including extreme weather events and climate change.

Commenters supporting FHWA's legal authority for a GHG performance measure also cited a number of provisions in title 23 of the United States Code as authority for the GHG measure. These included 23 U.S.C. 134(a)(1), 23 U.S.C. 134(c)(1), 23 U.S.C. 134(h), 23 U.S.C. 135(d)(1), and 23 U.S.C. 101(b)(3)(G).

Some commenters encouraged FHWA to interpret "air pollution" in 23 U.S.C. 134(a)(1) in a manner consistent with the definition of "air pollution" under the Clean Air Act,<sup>25</sup> which commenters felt would clearly bring GHG within the scope of 23 U.S.C. 134(a)(1) and under FHWA's authority. Commenters pointed to the CMAQ program as evidence of congressional intent to integrate the Clean Air Act into transportation planning. One commenter cited the Supreme Court decision in *Massachusetts v. EPA*, 547 U.S. 497, 528–29 (2007), for the principle that a GHG performance measure would not impermissibly conflict with the jurisdiction of other agencies, such as EPA.

One commenter stated that the authorizing language in 23 U.S.C. 150(c)(1) mandates that FHWA promulgate rules establishing performance measures and standards and in adopting that provision, Congress granted FHWA authority to promulgate rules establishing standards for performance management that apply to programs and objectives beyond those programs listed in 23 U.S.C. 150(c)(3)–(6). According to the commenter, the 23 U.S.C. 150(c)(2)(C) language limiting subsection 150(c) performance measures to those described in that subsection does not apply to performance standards adopted pursuant to the authorizing language in subsection 150(c)(1). The commenter concluded that 23 U.S.C. 150(c)(1) and 23 U.S.C.

135(d)(2) together give FHWA authority to establish standards for performance-based decisionmaking related to the national goals and planning objectives, including a GHG-related performance standard.

A number of commenters stated FHWA has no authority to adopt a GHG performance measure because they interpreted language in 23 U.S.C. 150(c)(2)(C) as barring the adoption of any measure not expressly listed in the statute. According to those commenters, the absence of a direct mention of GHG or climate change in the statute forecloses adoption of a GHG performance measure because 23 U.S.C. 150(c)(2)(C) states that in carrying out rulemaking for performance measures and standards, the Secretary shall limit performance measures "to those described in this subsection." One commenter also took the position a GHG performance measure would not be related to any of the measures expressly listed in 23 U.S.C. 150(c). One commenter stated that, because a GHG measure would not be among the types of measures allowed by 23 U.S.C. 150(c), and because there is no ambiguity in the statute, adoption of a GHG measure would violate the separation of powers doctrine in the U.S. Constitution.

Several commenters focused on the possibility of legal authority for promulgating a GHG performance measure stemming from the CMAQ provision in 23 U.S.C. 150(c)(5). Those commenters viewed the term "on-road mobile source emissions" in 23 U.S.C. 150(c)(5) as limited in scope to actions that further the purposes of the CMAQ statute, 23 U.S.C. 149. In their view, any performance measure under 23 U.S.C. 150(c)(5) would have to relate to one or more of the three pollutants listed in the CMAQ statute, 23 U.S.C. 149. Those commenters pointed out that none of the three listed pollutants is a GHG. A few pointed to an FHWA response in its recent final rule for metropolitan and statewide planning as being an admission no authority exists for a GHG measure, citing 81 FR 34050, 34077 (May 27, 2016).

Finally, some commenters suggested FHWA should not issue a GHG performance measure because other Federal offices and agencies have authority over such emissions and already are taking action in this area. They pointed to regulations adopted by the National Highway Traffic Safety Administration and EPA, as well as the recent issuance by the President's Council on Environmental Quality (CEQ) of National Environmental Policy

Act (NEPA) guidance on addressing GHGs.<sup>26</sup>

In response to the comments on FHWA's legal authority for a GHG performance measure, FHWA first acknowledges the concerns and views expressed by commenters on both sides of the question. Commenters' responses to the NPRM's request for comments on a GHG measure provided important information for FHWA to consider when developing the final rule. After reviewing and fully evaluating all of the comments, FHWA confirmed that it has legal authority to adopt the GHG performance measure contained in this rule. The FHWA disagrees with commenters who stated there is no legal authority under 23 U.S.C. 150 for a GHG performance measure. In 23 U.S.C. 150(c)(3)–(6), the statute defines the general topics of statutory concern to be addressed by performance measures and the related program statutes (*e.g.*, condition of pavements on the Interstate and non-Interstate NHS for the purpose of carrying out 23 U.S.C. 119). While FHWA agrees performance measures adopted under 23 U.S.C. 150 must relate to the measures described in 23 U.S.C. 150(c), the statute gives FHWA the discretion to determine the nature and scope of specific performance measures that will fulfill the statutory mandates in 23 U.S.C. 150(c). Contrary to the interpretation of some commenters, FHWA's response in the final planning rule, stating 23 U.S.C. 150(c)(2)(C) "precludes FHWA from establishing any national performance measures *outside those areas identified in 23 U.S.C. 150*" (87 FR 34050, 34077) (emphasis added), conveyed this same point. Accordingly, in the three rulemakings to implement 23 U.S.C. 150, FHWA has adopted performance measures it determined were related to the 23 U.S.C. 150(c)(3)–(6) areas of concern and the cited program statutes. The FHWA has not adopted any performance measure that falls outside of those statutory parameters. The GHG performance measure established in this rule is no exception.

The FHWA is adopting the GHG performance measure under 23 U.S.C. 150(c)(3), which calls for performance measures that the States can use to assess performance of the Interstate and non-Interstate NHS for the purpose of carrying out 23 U.S.C. 119. 23 U.S.C. 150(c)(3)(A)(ii)(IV)–(V). Section

<sup>25</sup> 42 U.S.C. 7602(g),

<sup>26</sup> *Final Guidance for Federal Departments and Agencies on Consideration of Greenhouse Gas Emissions and the Effects of Climate Change in National Environmental Policy Act Review*, CEQ (August 1, 2016). Available as of September 14, 2016 at <https://www.fhwa.dot.gov/map21/guidance/guidecmaq.cfm>.



150(c)(3) does not impose any limitation on what type of NHS performance may be measured in rules promulgated under 23 U.S.C. 150(c)(3)(A)(ii)(IV)–(V). Consistent with its long-standing practice, FHWA interprets “performance” of the Interstate and non-Interstate NHS in those provisions to include environmental performance. This interpretation is supported by the many title 23 provisions that make the environment an integral part of the Federal-aid Highway Program, such as the national goal of environmental sustainability in 23 U.S.C. 150(b)(6), transportation planning provisions in 23 U.S.C. 134–135, and environmental provisions in 23 U.S.C. 109(c),(g),(h),(i), and (j).<sup>27</sup> The FHWA interpretation also is supported by the many FHWA actions to treat the environment, and specifically sustainability and climate change, as part of system performance. Examples include:

- The FHWA Strategic Plan, which embodies this view in its national system performance strategic goal: “The Nation’s Highway system provides safe, reliable, effective and sustainable mobility for all users.”<sup>28</sup>
- The FHWA 2013 Conditions and Performance Report, which noted the transportation system is best able to reach peak performance when it can support economic competitiveness by providing adequate capacity and reliability while meeting sustainability goals.<sup>29</sup> For those reasons, FHWA stated, transportation agencies are being held accountable for how well they address these issues along with safety and state of good repair. The Report discussed the need to address climate change as part of promoting sustainability. The report described sustainability as requiring action to address climate change effects both through the reduction of GHG emissions and by ensuring the transportation system can adapt to future conditions caused by climate change.<sup>30</sup>
- FHWA’s July 2013 guidance, *Handbook for Estimating Transportation Greenhouse*

*Gases for Integration into the Planning Process*.<sup>31</sup>

- FHWA’s December 2013 guidance, *A Performance-Based Approach to Addressing Greenhouse Gas Emissions through Transportation Planning*.<sup>32</sup>
- FHWA Order 5520, *Transportation System Preparedness and Resilience to Climate Change and Extreme Weather Effects* (December 15, 2014),<sup>33</sup> which states climate change and extreme weather events are a significant and increasing risk to the safety, reliability, effectiveness, and sustainability of transportation infrastructure and operations. The Order points to the costly and sometimes recurring damage to infrastructure from such climate change effects as sea level rise, resulting in a need to address potential effects of climate change in order to protect the integrity of the transportation system and to ensure the sound investment of taxpayer dollars.<sup>34</sup>
- The Long Term Bridge Performance Program (enacted under SAFETEA–LU, Pub. L. 109–59, 119 Stat. 1144 (August 10, 2005)). The program defines bridge performance, in part, as a multifaceted issue that involves multiple components and depends on multiple factors, including varying conditions of climate, air quality, and soil properties.<sup>35</sup>
- The FHWA guidance on environmental performance in infrastructure development, construction, and maintenance.<sup>36</sup>

Thus, as described in the NPRM for this rulemaking, FHWA already has taken steps to “integrate climate analysis into the transportation planning process” and to “encourage[] transportation agencies to consider GHG

emissions as part of their performance-based decisionmaking . . .” 81 FR at 23830.

Additional statutory support for a GHG measure may be found in 23 U.S.C. 119, which is the program statute referenced in 23 U.S.C. 150(c)(3). Section 119, enacted by MAP–21, sets forth the purposes of the NHPP, eligibilities for NHPP funding, purposes and requirements for State performance management (including asset management, significant progress and reporting requirements for performance measures), Interstate and bridge condition penalty provisions for falling below minimum conditions established by the Secretary, and environmental mitigation. Under the statute, the purposes of the NHPP include “to provide support for the condition and performance of the [NHS].” 23 U.S.C. 119(b). The performance management provisions in 23 U.S.C. 119(e) call for a performance-driven asset management plan that would “support progress toward the achievement of the national goals identified in section 150(b).” The national goals in 23 U.S.C. 150(b) include environmental sustainability. The environmental sustainability goal is to be achieved by “enhancing the performance of the transportation system while protecting and enhancing the natural environment.” 23 U.S.C. 150(b)(6). By incorporating the environmental sustainability goal into 23 U.S.C. 119, the statute affirms environmental sustainability as part of the performance of the NHS addressed by 23 U.S.C. 150(c)(3). Measures for assessing the performance of the NHS for the purpose of carrying out 23 U.S.C. 119 may include measures furthering the environmental sustainability national goal. The GHG performance measure falls within these parameters.<sup>37</sup>

The FHWA agrees with commenters who cited several provisions in title 23 (23 U.S.C. 101(b)(3)(G), 134(a)(1), 134(c)(1), 134(h), 135(d)(1), and 135(d)(2)) in support of FHWA’s authority to address GHG emissions in this rulemaking. Those provisions identify interrelationships among, and in some cases call for action related to, environment, energy conservation, infrastructure performance, resiliency, and performance-based decisionmaking:

<sup>37</sup> Another national goal is congestion reduction (23 U.S.C. 150(b)(3)). In some cases, reduction in GHGs and congestion reduction are linked. For a discussion of the relationship between GHG emissions and congestion, see *Transportation’s Role in Reducing U.S. Greenhouse Gas Emissions, Volume 1, Synthesis Report*, USDOT Report to Congress (April 2010) (available as of September 14, 2016), at <http://www.reconnectingamerica.org/assets/Uploads/DOTClimateChangeReport-April2010-Volume1and2.pdf>.

<sup>27</sup> In addition, a number of statutes outside title 23, such as NEPA (42 U.S.C. 4321 *et seq.*), require consideration of the environment as part of developing and implementing infrastructure projects.

<sup>28</sup> *FHWA Strategic Plan* (2008–2016). The FHWA first adopted the plan in 2008 (available as of September 14, 2016 at <http://www.fhwa.dot.gov/strategicplan.pdf>). Since then, FHWA has updated the plan periodically, but the strategic goals and objectives have not changed. The FHWA did remove the sections outlining national strategies for achieving the agency’s strategic goals. This was done because the national strategies may change from year-to-year. The current version of the *FHWA Strategic Plan* (2016) is available at <http://www.fhwa.dot.gov/policy/fhplan.cfm> (as of September 14, 2016).

<sup>29</sup> *FHWA 2013 Conditions and Performance Report* (PDF Version) at 5–2. Available as of September 14, 2016, at <https://www.fhwa.dot.gov/policy/2013cpr/>.

<sup>30</sup> *Id.* at 5–6 through 5–7.

<sup>31</sup> Available as of September 14, 2016, at [http://www.fhwa.dot.gov/environment/climate\\_change/mitigation/publications/ghg\\_handbook/ghghandbook.pdf](http://www.fhwa.dot.gov/environment/climate_change/mitigation/publications/ghg_handbook/ghghandbook.pdf).

<sup>32</sup> Available as of September 14, 2016, at [http://www.fhwa.dot.gov/environment/climate\\_change/mitigation/publications/ghg\\_planning/ghg\\_planning.pdf](http://www.fhwa.dot.gov/environment/climate_change/mitigation/publications/ghg_planning/ghg_planning.pdf).

<sup>33</sup> Available as of September 14, 2016, at <http://www.fhwa.dot.gov/legregs/directives/orders/5520.cfm>.

<sup>34</sup> See Section 3 of FHWA Order 5520 (December 15, 2014).

<sup>35</sup> See Long-Term Bridge Performance Program Web site (available as of September 14, 2016, at <https://www.fhwa.dot.gov/research/tfhrcc/programs/infrastructure/structures/tltp/about.cfm>).

<sup>36</sup> See, e.g., “Improving Environmental Performance in Construction and Maintenance, FHWA Successes in Stewardship Newsletter (March 2005, available as of September 14, 2016, at <https://www.environment.fhwa.dot.gov/strmlng/newsletters/mar05nl.asp>); “Highways in the Coastal Environmental: Assessing Extreme Federal Highway Administration, Hydraulic Engineering”, FHWA Hydraulic Engineering Circular No. 1 25–Vol. 2, Publication No. FHWA–NHI–14 (October 2014, available as of September 14, 2016, at <http://www.fhwa.dot.gov/engineering/hydraulics/pubs/nhi14006/nhi14006.pdf>); “Eco-Logical: An Ecosystem Approach to Developing Infrastructure Projects”, FHWA Environmental Review Toolkit (available as of September 14, 2016, at [https://www.environment.fhwa.dot.gov/ecological/eco\\_5.asp](https://www.environment.fhwa.dot.gov/ecological/eco_5.asp)); Office of Infrastructure Research and Development Web page (available as of September 14, 2016, at <https://www.fhwa.dot.gov/research/tfhrcc/offices/infrastructure/>).

• 23 U.S.C. 101(b)(3)(G) is a transportation policy declaration that “. . . transportation should play a significant role in promoting economic growth, improving the environment, and sustaining the quality of life . . .”.

• 23 U.S.C. 134(a)(1) is a congressional statement of transportation planning policy that it is in the national interest “. . . to encourage and promote the safe and efficient management, operation, and development of surface transportation systems . . . while minimizing transportation-related fuel consumption and air pollution through metropolitan and statewide transportation planning processes identified in this chapter . . .”.

• 23 U.S.C. 134(c)(1) requires metropolitan planning organizations to develop long range plans and transportation improvement programs to achieve the objectives in section 134(a)(1) through a performance-driven, outcome-based approach to planning.

• 23 U.S.C. 134(h) defines the scope of the metropolitan planning process. Paragraphs (h)(1)(E) and (I), respectively, require consideration of projects and strategies that will “. . . protect and enhance the environment, promote energy conservation, improve the quality of life . . .” and “. . . improve the resiliency and reliability of the transportation system . . .”.

• 23 U.S.C. 135(d)(1) defines the scope of the statewide planning process. Paragraphs (d)(1)(E) and (I) respectively, require consideration of projects, strategies, and services that will “. . . protect and enhance the environment, promote energy conservation, improve the quality of life . . .”, and “. . . improve the resiliency and reliability of the transportation system . . .”.

• 23 U.S.C. 135(d)(2) requires the statewide transportation planning process to “. . . provide for the establishment and use of a performance-based approach to transportation decisionmaking to support the national goals described in section 150(b) of this title . . .”.

In addition to the provisions listed above, the performance-based planning requirements in 23 U.S.C. 134(h)(2)(A) mirror the statewide provision in 23 U.S.C. 135(d)(2), stating the “. . . planning process shall provide for the establishment and use of a performance-based approach to transportation decisionmaking to support the national goals described in section 150(b) of this title . . .”.

Read together, these title 23 provisions make it clear that assessing infrastructure performance under 23 U.S.C. 150(c)(3) may properly encompass assessment of environmental performance, including GHG emissions and other climate-related matters. The fact that other Federal agencies have jurisdiction to act on those matters (in this case, climate change and GHGs) does not preclude FHWA from taking actions to help ensure the Federal-aid Highway Program fulfills its statutory objectives in title 23.

With respect to comments regarding FHWA’s authority to establish a GHG performance measure pursuant to 23 U.S.C. 150(c)(5) (CMAQ), FHWA agrees such authority exists, but FHWA has chosen to adopt the measure under 23 U.S.C. 150(c)(3) (NHPP) because it is more consistent with FHWA’s view that environmental performance is a key indicator of the success of the highway system, and because 23 U.S.C. 150(c)(3) permits the application of the measure to the entire NHS. The FHWA also agrees with commenters that FHWA has authority to establish performance standards pursuant to 23 U.S.C. 150(c)(1) and that the performance standard authority is not subject to the limiting language in 23 U.S.C. 150(c)(2)(C). However, this rulemaking is for performance measures, and FHWA does not believe it would be appropriate to use this rulemaking to establish a GHG emissions performance standard for States and MPOs.

#### Establishing a GHG Performance Measure in This Rulemaking

Several commenters argued that, should FHWA decide to establish a GHG performance measure, it should do so through a separate rulemaking. They claimed that the NPRM did not provide sufficient detail about the type of measure FHWA might adopt for them to comment on the issue meaningfully. The FHWA disagrees. The NPRM clearly signaled that FHWA was considering a GHG performance measure, pointed out the substantial body of research and guidance that FHWA and others have developed on ways to incorporate GHGs into performance-based transportation planning and programs, requested comment on a series of questions about whether and how to establish a GHG performance measure, and identified a preferred approach if a measure was to be adopted. The FHWA received many substantive comments in response to these questions, including from those who claimed the need for another round of rulemaking. These comments included numerous suggestions on how to structure (and not structure) a GHG measure. The FHWA relied on these comments to refine the measure included in the final rule. The CO<sub>2</sub> performance measure established in this rule is the same as that described in the NPRM and is consistent with elements recommended in several of the comments received. The detail and substance of information and suggestions received in response to the questions FHWA posed clearly show that interested parties were capable of providing, and in fact did provide,

informed comments regarding the establishment of a GHG performance measure.

#### Discussion of Comments Received in Response to NPRM Questions

a. Should FHWA include a measure that measures Greenhouse Gases (GHG)?

The FHWA’s decision to establish a GHG measure is responsive to three major categories of comments:

(1) Numerous commenters claimed that the set of performance measures proposed in the NPRM was too narrowly focused on the speed of vehicles moving through the system, to the detriment of other key aspects of system performance such as environmental performance, and the ability of people to reach a variety of destinations conveniently and affordably by multiple modes.<sup>38</sup> The FHWA agrees that as sound policy, the set of national performance measures must cover multiple key aspects of performance, otherwise decisionmaking may not properly take into account important aspects of performance. In response, this final rule includes measures on GHG emissions and modal share and consolidates NPRM measures stakeholders perceived as duplicative.

(2) Multiple commenters noted that a GHG measure would provide decisionmakers with better information about the transportation system’s GHG emissions and a means for measuring progress. The State DOTs from California, Colorado, Delaware, Minnesota, Oregon, Pennsylvania, Vermont, Virginia, and Washington submitted a joint letter supporting the creation of a measure specific to GHG emissions from the transportation sector. The National Association for Clean Air Agencies noted that performance measures create transparency and help policy makers to determine how their goals are most likely to be achieved. The FHWA agrees with these comments.

(3) Numerous commenters<sup>39</sup> argued that a GHG measure should be implemented because policies to reduce GHG pollution from transportation are essential to minimize the impacts from climate change, which include sea level rise and increased frequency and

<sup>38</sup> See comments from New York State DOT, Nelson Nygaard, Sierra Club, Utah DOT, Association of Metropolitan Planning Organizations (AMPO), and the National Association of Regional Councils (NARC), as well as citizen letter campaigns sponsored by Transportation for America and Smart Growth America.

<sup>39</sup> See for instance comments from Center for Neighborhood Technology, Natural Resources Defense Council, U.S. Public Interest Research Group.



severity of heat waves and heavy downpours that threaten human health, agriculture, the economy, and transportation.<sup>40</sup> Reports from FHWA and the National Academy of Sciences detail negative impacts of climate change on the NHS.<sup>41</sup>

The FHWA agrees with these comments. Greenhouse gas emissions from the transportation sector recently surpassed those from electricity generation, making transportation the largest source of GHG emissions in the U.S.<sup>42</sup> After decades of rapid increases, U.S. transportation carbon emissions are projected to remain relatively flat in the future, as future increases in freight and passenger travel are counterbalanced by stricter fuel economy standards for light-duty vehicles and new standards for medium- and heavy-duty vehicles.<sup>43</sup> Significantly greater reductions in transportation GHG emissions are needed to meet the near-term target of 26 to 28 percent below 2005 levels by 2025 and long-term trajectories of 80 percent or more by 2050 which would be consistent with the U.S. Midcentury Strategy for Deep Decarbonization and consistent with the long-term goals of the Paris Agreement.<sup>44</sup> Achieving CO<sub>2</sub>

reductions of this magnitude will require actions such as reducing the growth in future travel activity and improving system efficiency, which are influenced by the planning activities and investment decisions of State DOTs and MPOs. A GHG measure emerged as a leading candidate for measuring the environmental aspect of the performance of the highway system during FHWA and stakeholder discussions in 2009.<sup>45</sup> Subsequently, FHWA initiated a research project to investigate GHG measures that would align with performance-based planning and programming, as well as how State DOTs and MPOs could go about implementing such a measure. A number of FHWA stakeholders served on the expert panel that provided input into the development of the resulting research report, *A Performance-Based Approach to Addressing Greenhouse Gas Emissions through Transportation Planning*.<sup>46</sup>

The FHWA disagrees with commenters that argued that FHWA should not include a GHG measure because they felt that State DOTs and MPOs have insufficient ability to impact GHG emissions. State DOTs and MPO recipients of Federal transportation funds have control or influence over many strategies that impact transportation GHG emissions. These strategies can be divided into four major groups:<sup>47</sup>

(1) *System efficiency*. These strategies optimize the operation, use, and maintenance of transportation networks, which in turn reduce GHG emissions per unit of travel. Relevant strategies include speed harmonization, speed limit reduction and enforcement, ramp metering, incident management, traveler information, traffic signal timing optimization, bottleneck relief, anti-idling ordinances, congestion pricing, and the improvement in freight intermodal connections.

(2) *Reducing the growth in VMT*. These strategies reduce the need to travel, increase vehicle occupancies,

and shift travel to more energy efficient options. Relevant strategies include integrated transportation and land use planning in coordination with local governments, public transportation and non-motorized transportation improvements and incentives, car sharing, employer-based strategies (such as telework), parking management and pricing, road pricing, and pay-as-you drive insurance.

(3) *Promoting alternative fuel vehicles*. State DOTs and MPOs can help plan for the siting and deployment of electric vehicle charging stations, designate and promote alternative fuel corridors, promote workplace charging initiatives, and promote adoption of alternative vehicles within agency and private fleets.

(4) *Increasing vehicle fuel efficiency*. State DOTs and MPOs can help bring to market higher efficiency vehicles and improve the performance of in-use vehicles. Relevant strategies include scrappage programs for low-mileage vehicles, feebates, heavy-duty vehicle retrofits, truck stop electrification, and eco-driver education and training.

The FHWA disagrees with the American Petroleum Institute, which suggested that FHWA should not include a performance measure on GHG because transportation GHG emissions are regulated by fuel economy standards. Continued growth in VMT is expected to counterbalance improvements in fuel economy, and as such, fuel economy standards alone are insufficient to reach GHG goals.

To allay some of the burden concerns raised by those arguing against a GHG emissions measure, FHWA has chosen a measure that relies on existing data and is straightforward to calculate. Limiting the measure to CO<sub>2</sub> simplifies calculations (since unlike the other GHGs, it is emitted in direct proportion to the amount of fuel burned), while still capturing 95 percent of transportation GHGs.<sup>48</sup> Limiting the measure to on-road emissions rather than full life cycle also simplifies analysis. The overall burden on State DOTs and MPOs is further reduced in the final rule by the elimination of the two NHPP peak hour performance measures and the truck congestion measure.

<sup>48</sup> U.S. Department of Transportation, *Report to Congress: Transportation's Role in Reducing U.S. Greenhouse Gas Emissions*, 2010. The other greenhouse gases from transportation are hydrofluorocarbons (HFCs), methane (CH<sub>4</sub>) and nitrous oxide (N<sub>2</sub>O).

<sup>40</sup> United States Government, *National Climate Assessment*, 2014. <http://nca2014.globalchange.gov/>.

<sup>41</sup> U.S. Department of Transportation, *Gulf Coast Study Phases I and II*, 2008 and 2015. [http://www.fhwa.dot.gov/environment/climate\\_change/adaptation/ongoing\\_and\\_current\\_research/gulf\\_coast\\_study/](http://www.fhwa.dot.gov/environment/climate_change/adaptation/ongoing_and_current_research/gulf_coast_study/).

Federal Highway Administration, *Climate Resilience Pilot Program: Outcomes, Lessons Learned, and Recommendations*, 2016. [http://www.fhwa.dot.gov/environment/climate\\_change/adaptation/resilience\\_pilots/2013-2015\\_pilots/final\\_report/](http://www.fhwa.dot.gov/environment/climate_change/adaptation/resilience_pilots/2013-2015_pilots/final_report/).

The Transportation Research Board of the National Academy of Sciences, *The Potential Impacts of Climate Change on US Transportation*, 2008. <http://www.trb.org/Main/Blurbs/156825.aspx>.

Impacts include increases in flooding damaging roadways and disrupting travel, increases in heat waves degrading materials and impacting worker health and productivity, permafrost melt destabilizing roadways, changes in precipitation patterns leading to more landslides, drought conditions causing soil shrinkage and pavement cracking, as well as increased susceptibility to wildfires, causing road closures. Climate change increases the frequency and/or intensity of many extreme weather events that damage or disrupt transportation. Scenarios with lower greenhouse gas emissions in the future show lower negative impacts on the transportation system.

<sup>42</sup> U.S. Department of Energy, Energy Information Agency (EIA), <http://www.eia.gov/totalenergy/data/monthly/>.

<sup>43</sup> U.S. Department of Energy, Energy Information Agency (EIA), *Annual Energy Outlook*, 2016. [http://www.eia.gov/forecasts/aeo/tables\\_ref.cfm](http://www.eia.gov/forecasts/aeo/tables_ref.cfm).

<sup>44</sup> U.S. Government, "Fact Sheet: U.S. Reports its 2025 Emissions Target to the UNFCCC," March 2015. <https://www.whitehouse.gov/the-press-office/2015/03/31/fact-sheet-us-reports-its-2025-emissions-target-unfccc>.

U.S. Government, "U.S. Mid-Century Strategy for Deep Decarbonization," November 4, 2016. <https://www.whitehouse.gov/the-press-office/2016/11/04/us-mid-century-strategy-for-deep-decarbonization>.

[www.whitehouse.gov/sites/default/files/docs/mid\\_century\\_strategy\\_report-final.pdf](http://www.whitehouse.gov/sites/default/files/docs/mid_century_strategy_report-final.pdf).

<sup>45</sup> American Association of State Highway and Transportation Officials (AASHTO) Standing Committee on Performance Management (SCOPM), "Meeting Minutes," October 23, 2009. <http://scopm.transportation.org/Documents/Minutesof10.09SCOPMMeeting.doc>.

<sup>46</sup> FHWA, *A Performance-Based Approach to Addressing Greenhouse Gas Emissions through Transportation Planning*, December 2013, Acknowledgements section of report front matter. [http://www.fhwa.dot.gov/environment/climate\\_change/mitigation/publications/ghg\\_planning/ghg\\_planning.pdf](http://www.fhwa.dot.gov/environment/climate_change/mitigation/publications/ghg_planning/ghg_planning.pdf).

<sup>47</sup> U.S. Department of Transportation, *Report to Congress: Transportation's Role in Reducing U.S. Greenhouse Gas Emissions*, 2010.



Should the measure address all on-road mobile sources or focus only on a particular vehicle type?

All of the commenters who responded to this question favored a measure that addressed all on-road mobile sources. The FHWA agrees. This approach allows for a more comprehensive picture of the transportation system's contribution to emissions, from passenger vehicles to freight movement.

b. Should the measure be normalized by changes in population, economic activity, or other factors (e.g., per capita or per unit of gross state product)?

Multiple commenters suggested that the measure examine both total emissions and be normalized by changes in population. Total emissions will need to be reduced to achieve GHG reduction goals; normalizing on a per capita basis acknowledges the fact that many States and regions are experiencing significant population growth. In addition to normalizing by population, the Texas DOT suggested normalizing by gross State product, port activity, State land mass, and consideration of the current built environment. Another commenter noted that a GHG performance measure indexed to gross State product or other economic indicators could rise or fall quickly based on economic trends that are difficult to predict, limiting its value in decisionmaking.

The FHWA decided a total on-road CO<sub>2</sub> measure (limited to travel on the NHS) is the best option. It makes assessment of progress toward performance management targets and national U.S. goals relatively easy. In contrast, CO<sub>2</sub> per capita could be decreasing while total on-road CO<sub>2</sub> is still increasing, failing to provide the total emissions data needed to understand and measure the performance goal of environmental sustainability.

The FHWA notes that State DOTs and MPOs have discretion to use additional performance measures and may wish to normalize CO<sub>2</sub> by total population as an additional useful indicator in their analyses. An FHWA research project identified light-duty vehicle CO<sub>2</sub> emissions per capita as a helpful additional measure to combine with the total on-road emissions measure. The research project report also includes information on data sources and methodologies.<sup>49</sup>

c. Should the measure be limited to emissions coming from the tailpipe, or should it consider emissions generated upstream in the life cycle of the vehicle operations (e.g., emissions from the extraction/refining of petroleum products and the emissions from power plants to provide power for electric vehicles)?

Some commenters, including most of the MPO and State DOT commenters, recommended that the measure focus solely on tailpipe emissions, noting that tailpipes are the largest source of transportation emissions. These commenters noted that upstream fuel cycle emissions are more difficult to calculate and are largely outside the control of the transportation agency.

Others, including the Center for Neighborhood Technology, Natural Resource Defense Council, the National Association for City Transportation Officials, and the New York City DOT recommended that the performance measure include emissions generated upstream.

Several commenters, including the Sabin Center for Climate Change Law and the CMAP, recommended an intermediate approach to account for the electricity used to power electric vehicles.

After considering these comments and balancing the factors, FHWA decided to limit the measure to on-road CO<sub>2</sub> emissions for reasons of focus and simplicity.

One difficulty with upstream emissions from petroleum extraction and refining is they vary by where and how the fuel is extracted. An option is to use the national average adjustment factor of 27 percent to account for the upstream fuel-cycle emissions.<sup>50 51 52</sup> This methodology can be helpful for understanding transportation's overall contribution to GHG emissions, but does not add value as a measure of State or MPO performance. Adjustments based on the national average fail to provide the type of differentiated information needed to capture the outcomes of State and MPO actions. A measure focused on tailpipe emissions simplifies the calculations and provides the type of specific information helpful to States and MPOs as they determine what measures to adopt to influence GHG outcomes.

The FHWA considered the comments supporting a measure that captures upstream emissions from electric cars,

but declines to do so at this time because of the complexity it would add to the measure. Upstream emissions from electricity are more difficult to calculate because one must estimate the level of electricity consumed by electric vehicles. These data are not tracked separately and generally are estimated based on electric vehicle registration data. In addition, excluding upstream electricity emissions will preserve the rule's focus on on-road emissions. While FHWA has decided to exclude upstream emissions from the GHG measure in this rule, research indicates electric vehicles typically produce lower lifecycle GHG emissions than the average gasoline-based vehicle, even when using electricity from the highest carbon U.S. electricity grids.<sup>51 thnsp;52</sup> Transportation agency actions to encourage electric vehicle use (such as deployment of charging infrastructure, preferred use of High Occupancy Vehicle/express lanes for electric vehicles, etc.) will result in reduced overall CO<sub>2</sub> emissions as well as reduced CO<sub>2</sub> emissions in the tailpipe measure.

State DOTs may voluntarily report additional measures of CO<sub>2</sub> performance, in addition to their baseline requirement. These additional measures, or variations, could include metrics for electric vehicle emissions, VMT-based estimates, and/or per capita emissions, among other options to test innovative reporting options. The FHWA's online reporting portal allows the State to attach supplemental information at their discretion.

d. Should the measure include non-road sources, such as construction and maintenance activities associated with Title 23 projects?

Several commenters, including the Georgia and Minnesota DOTs, Denver Regional Council of Governments, and the San Francisco Municipal Transportation Agency, recommended that the measure be limited to tailpipe emissions. These commenters said that tailpipe emissions make up the majority of transportation emissions and that construction and maintenance emissions are more difficult to calculate. Other commenters recommended that tracking emissions from construction and maintenance of highway projects is desirable, but that emissions from

<sup>51</sup> Union of Concerned Scientists, *Cleaner Cars from Cradle to Grave*, 2015. [http://www.ucsusa.org/clean-vehicles/electric-vehicles/life-cycle-ev-emissions#.V\\_Ug2E2V\\_ct](http://www.ucsusa.org/clean-vehicles/electric-vehicles/life-cycle-ev-emissions#.V_Ug2E2V_ct).

<sup>52</sup> Department of Energy, *Emissions from Hybrid and Plug-in Vehicles*, 2016. [http://www.afdc.energy.gov/vehicles/electric\\_emissions.php](http://www.afdc.energy.gov/vehicles/electric_emissions.php).

<sup>49</sup> FHWA, *A Performance-Based Approach to Addressing Greenhouse Gas Emissions through Transportation Planning*, December 2013.

<sup>50</sup> The U.S. EPA published estimates of fuel-cycle greenhouse gas emissions in "Greenhouse Gas Emissions from the U.S. Transportation Sector, 1990–2003." <sup>1</sup> The U.S. EPA calculated a national average adjustment factor of 1.27 (or 27 percent).

facility use (*i.e.*, tailpipe emissions) warrant the largest share of attention and analysis.

The FHWA agrees with commenters that the measure should be limited to tailpipe emissions. Accordingly, construction and maintenance emissions are not included in the CO<sub>2</sub> emissions measure because of the complexity and burden it would add to the measure. The level of construction and maintenance emissions varies year to year based on project cycles. This means that grouping them with on-road vehicle emissions in a single performance measure would make it more difficult to analyze trends and ascertain progress. A separate measure for construction and maintenance CO<sub>2</sub> emissions may be helpful, but FHWA is not adopting such additional measure in this rulemaking. The FHWA wishes to limit the performance management burden on State DOTs and MPOs by, in part, limiting the number of performance measures adopted in this rulemaking.

However, FHWA encourages State DOTs and MPOs efforts to track and reduce construction and maintenance CO<sub>2</sub> emissions. One tool for this is FHWA's Infrastructure Carbon Estimator (ICE)<sup>53</sup> tool. These emissions can be included in other CO<sub>2</sub> emissions analyses that agencies may be conducting during the transportation planning process.

e. Should State-level CO<sub>2</sub> emissions be estimated based on gasoline and diesel fuel sales, system use (vehicle miles traveled [VMT]), or other surrogates?

Several commenters, including the DOTs of California, Colorado, Delaware, Virginia, Oregon, Pennsylvania, Vermont, Wisconsin, and Minnesota, recommended that, at least in the short term, the measure should use fuel sales data to calculate CO<sub>2</sub> emissions. They noted that CO<sub>2</sub> is emitted in direct proportion to the amount of fuel burned and that States already report fuel sales data to FHWA. However, commenters noted some disadvantages of using fuel sales data: It is not available at finer geographic scales, such as the metropolitan level, and there are boundary issues with fuel purchased in one State but combusted in another State or region.

Other commenters, including the Georgia DOT, Denver Regional Council of Governments, Southwest Energy Efficiency Project, and the Center for Neighborhood Technology,

recommended that the measure should use VMT as the basis for estimating CO<sub>2</sub> emissions. They stated that using VMT data from travel demand models combined with the EPA MOVES<sup>54</sup> model to estimate CO<sub>2</sub> emissions based on travel distances, speeds, and operating conditions provide an accurate picture of on-road CO<sub>2</sub> emissions in a State or region. In addition to calculating current emissions, this type of analysis is also helpful in understanding how State DOT and MPO investment decisions and policies, such as adding proposed new lane miles, can influence future CO<sub>2</sub> emissions by altering inputs to the travel demand model. The commenters acknowledged, however, that many State DOTs and MPOs lack the modeling expertise and quality data needed to use a method that relies on a travel demand model in combination with MOVES.

The FHWA decided that for calculating the CO<sub>2</sub> emissions performance measure, States will use a methodology that relies on fuel sales volumes. This method is simple, accurate, and relies on data that States already report to the agency. Commenters pointed out a fuel-based measure would have minimal implementation costs as compared to a VMT-based measure, which would require transportation agencies to dedicate staff to the effort and incur new ongoing costs.

Fuel-based methods typically rely on estimates of fuel sales and directly convert fuel use estimates into CO<sub>2</sub> emissions estimates based on the carbon content of each fuel. The basic equation for estimating CO<sub>2</sub> emissions using fuel sales is:

$$\text{Fuel Consumed} \times \text{CO}_2 \text{ emissions per unit of fuel} = \text{CO}_2 \text{ Emissions}$$

The CO<sub>2</sub> emissions factor depends on the fuel type (*e.g.*, motor gasoline, diesel).

The VMT-based methods rely on quantifying the amount of vehicle travel and then connecting this information to an estimate of CO<sub>2</sub> emissions using emission factors or an emissions model. The basic equation for estimating emissions using VMT is:

$$\text{VMT} \times \text{CO}_2 \text{ per VMT} = \text{CO}_2 \text{ Emissions}$$

However, to achieve an accurate picture and assess improvements, the process would have to use different emissions factors (typically presented in grams of CO<sub>2</sub> per mile) for different vehicle types,

classes within vehicle types, technology/fuels types, speeds, and operating conditions.

For the GHG performance measure, State DOTs must use the fuel sales methodology for calculating State on-road CO<sub>2</sub> on the NHS. However, in addition to the baseline requirement for State DOTs to report on-road CO<sub>2</sub> on the NHS using a fuel sales methodology, State DOTs may voluntarily report CO<sub>2</sub> emissions using alternative methods, such as VMT based methods. State DOTs would attach this as supplemental information in FHWA's online reporting portal.

For metropolitan planning areas, MPOs and State DOTs are granted flexibility in how they calculate the required CO<sub>2</sub> performance measure. The FHWA adopted these different approaches because of: (1) The lack of data available on fuels sales at the metropolitan planning area level and (2) the need to ensure one consistent method for State DOT measures in order to understand national performance trends and to allow for a consistent approach to progress determinations.

Methodologies available for calculating on-road NHS CO<sub>2</sub> emissions for metropolitan planning area include (in order of level of effort):

#### *Fuel-based Methods:*

If fuel sales volumes are available at the metropolitan planning area level, MPOs may use the same fuel-based method as outlined for the State DOTs (fuel volumes multiplied by emissions factors). The strengths of this method are that it is simple and consistent with the State method. There are limitations to this method. Fuel sales data are not usually available at the metropolitan planning area level. Also, fuel sales may not match well with actual travel activity in smaller geographic areas, as drivers may purchase fuel in one area and use it in another area. This is much more of a concern at the metropolitan planning area level than the State level since the metropolitan planning area is a smaller geographic unit.

Another option is for MPOs to allocate GHG emissions based on metropolitan planning area share of NHS VMT. This is done by multiplying the statewide NHS on-road CO<sub>2</sub> emissions by the percent of the State's NHS travel that occurs within the MPA. The strengths of this method are that it is simple, providing a rough estimate of the metropolitan planning area share of CO<sub>2</sub> emissions. However, this method does not account for differences between metropolitan areas and between metropolitan and rural areas in vehicle fleets, speeds, and operating

<sup>53</sup> FHWA, *Infrastructure Carbon Estimator*, [http://www.fhwa.dot.gov/environment/climate\\_change/mitigation/tools/carbon\\_estimator/](http://www.fhwa.dot.gov/environment/climate_change/mitigation/tools/carbon_estimator/).

<sup>54</sup> The Motor Vehicle Emissions Simulator (MOVES) is EPA's official model for estimating emissions from cars, trucks and motorcycles. <http://www.epa.gov/otaq/models/moves/index.htm>.



conditions. It will not accurately capture some types of strategies that the MPO may use to reduce CO<sub>2</sub> emissions, such as traffic smoothing with roundabouts or advanced signal timing.

*VMT-based Methods:*

The MPOs may use VMT from HPMS and national average emissions factors per mile of travel. The strengths of this method are that it is simple and well-gearred toward areas without network travel models. In addition, FHWA will provide emissions look-up tables by types of facilities and speed ranges reflecting national averages. The main limitation is that it does not account for the range of factors that vary in different locations and impact fuel consumption per mile of travel (and consequently CO<sub>2</sub> emissions per mile of travel), such as vehicle fleet composition, and operating conditions.

The MPOs also may use VMT from travel demand models combined with MOVES.<sup>55</sup> The strengths of this method include that MPOs in air quality nonattainment and maintenance areas are already conducting this analysis and can include CO<sub>2</sub> emissions in the MOVES output without additional effort. It provides robust and granular information on emissions. In addition to estimating current emissions, it is also well suited to support target-setting and analyze impacts of different transportation investment strategies on future emissions. However, some travel demand models are not sensitive to some CO<sub>2</sub> emissions reduction strategies such as the implementation of intelligent transportation system (ITS) strategies and operational improvements, the provision of pedestrian and bicycling infrastructure, and mixed use development. For areas not already using MOVES, MPOs will need to assemble local data or rely on default data, (relying on default data reduces accuracy). Areas not already using MOVES will need to become familiar with how to use the tool. Information on MOVES training is available on EPA's MOVES Web page: <https://www.epa.gov/moves/moves-training-sessions>.

A third option is FHWA's Energy and Emissions Reduction Policy Analysis Tool (EERPAT). The EERPAT is an integrated modeling system designed specifically to evaluate strategies for reducing surface transportation GHG emissions. It uses emissions factors from MOVES. There are several strengths to this method. In addition to estimating current emissions, EERPAT is also well suited to target-setting and analyzing impacts of different transportation

investment strategies on future emissions. It is sensitive to a number of strategies that are difficult to analyze using travel demand models, such as mixed use development, car sharing and provision of non-motorized infrastructure. The EERPAT can evaluate future changes in land use and is sensitive to external changes in the price of fuel. It can incorporate changes in vehicle technology, including the rebound effect from lower per-mile travel costs. It can be used to assess the overlapping effects of strategies applied in combination. The limitations of this method include the large number of model inputs required, some of which may be difficult to obtain. The EERPAT does not include a detailed representation of the transportation network, and has limited sensitivity to the impact of additional roadway and transit capacity.

The FHWA's *Handbook for Estimating Transportation Greenhouse Gases for Integration into the Planning Process* provides step-by-step instructions on how to use these methods, as well as information on strengths and limitations of each. If MPOs have the technical capacity to use MOVES or EERPAT, FHWA encourages them to do so since they are more accurate.

f. Due to the nature of CO<sub>2</sub> emissions (e.g., geographic scope and cumulative effects) and their relationship to climate change effects across all parts of the country, should the measure apply to all States and MPOs? Are there any criteria that would limit the applicability to only a portion of the States or MPOs?

Nearly all commenters agreed that if a GHG measure were established, it should apply nationwide to all State DOTs and MPOs since all GHG emissions have the same impact on climate no matter where they are generated. The Air Pollution Control Division of the Colorado Department of Public Health and Environment recommended measuring performance on a statewide basis, not locally or regionally. The California DOT recommended that the measure apply and be reported by all States and that MPOs be encouraged to participate in target-setting discussions. Similarly, the North Front Range MPO suggested that the role of MPOs be limited to participating with State DOTs in target setting and development of reduction strategies.

A building materials firm, CEMEX, suggested that efforts should focus on the roads with the most traffic and trucks, namely the NHS.

After considering the comments received, FHWA decided that the measure should apply to the NHS in all States and MPOs. The measure is limited to CO<sub>2</sub> emissions on the NHS since the measure is to assess the performance of the NHS, per 23 U.S.C. 150(c)(3)(A)(ii)(IV) and (V). Existing data do not differentiate the exact volumes of fuel burned on the NHS versus the volume of fuels burned on other roads. Therefore, States will use VMT data to calculate the portion of travel that occurs on the NHS versus other roads and use that proportion to estimate the proportion of CO<sub>2</sub> emissions on the NHS.<sup>56</sup> Table VM-3 Federal-Aid Highway Travel (Annual Vehicle-Miles), found in FHWA's *Highway Statistics*, supplies the needed VMT information.<sup>57</sup>

g. Would a performance measure on CO<sub>2</sub> emissions help to improve transparency and to realign incentives such that State DOTs and MPOs are better positioned to meet national climate change goals?

Several commenters noted that a CO<sub>2</sub> performance measure would help transportation agencies examine trends and analyze the effectiveness of strategies in achieving their goals. They also noted that it would create transparency, allowing stakeholders and the public to see what goals are being set, how they are being pursued, and the results the measure produced. The State DOTs of California, Colorado, Delaware, Minnesota, Oregon, Pennsylvania, Virginia, Vermont, and Washington recommended that FHWA work with States to develop a national climate change goal for transportation that aligns with the Paris Climate Change Agreement. These DOTs suggested that States should use a CO<sub>2</sub> performance measure to drive decisions that help to meet or exceed the national goals under that agreement.

The Georgia DOT noted that the performance measure's effect on transparency would depend on the transparency and complexity of the measure itself and the associated reporting requirements. A GHG measure could help align incentives with national climate change goals, but would be an additional factor to

<sup>56</sup> The FHWA recognizes that this is not a perfect proxy, as speeds, operating conditions, and vehicle types on the NHS differ from those on other roads and differ between States. However, in balancing the competing goals of simplicity and precision, FHWA believes that this approach provides actionable information that DOTs and MPOs can use in evaluating system performance and making decisions, without significantly increasing workloads.

<sup>57</sup> Available at <https://www.fhwa.dot.gov/policyinformation/statistics.cfm>.

<sup>55</sup> Or EMFAC in California.



consider in the tradeoff analysis conducted under a performance-based planning and programming approach.

The FHWA agrees with these comments. The CO<sub>2</sub> performance measure adopted in this rule can serve to advance the environmental performance of the NHS as well as to drive decisions that contribute to national GHG reduction goals, such as those described in the President's Climate Action Plan.<sup>58</sup> The simplicity of the GHG performance measure and the reporting requirements will make it easier for States and MPOs to administer the measure and their targets, and to incorporate reduction strategies into their planning process and investment decisions.

The Texas DOT suggested that any GHG emission reduction that State DOTs or MPOs could achieve would be small compared to the overall level of emissions. The FHWA notes that climate change results from the incremental addition of GHG emissions from millions of individual sources, which collectively have a large impact on a global scale. The totality of climate change impacts is not attributable to any single action, but is exacerbated by a series of actions, including actions taken under the Federal-aid Highway Program. Therefore, a statement that emissions from a proposed action represent only a small fraction of global emissions is essentially a statement about the nature of the climate change challenge<sup>59</sup> and is not an appropriate basis for deciding whether or to what extent to consider CO<sub>2</sub> emissions from transportation in the performance management framework.

Publicly-available FHWA reports provide detailed guidance on how State DOTs and MPOs can include GHG emissions measures in performance management and how to estimate emissions levels.<sup>60</sup>

<sup>58</sup> Executive Office of the President, *The President's Climate Action Plan*, June 2013. <https://www.whitehouse.gov/sites/default/files/image/president27sclimateactionplan.pdf>.

<sup>59</sup> Council on Environmental Quality, *Final Guidance for Federal Department and Agencies on Consideration of Greenhouse Gas Emissions and the Effects of Climate Change in National Environmental Policy Act Reviews*, 2016. [https://www.whitehouse.gov/sites/whitehouse.gov/files/documents/nepa\\_final\\_ghg\\_guidance.pdf](https://www.whitehouse.gov/sites/whitehouse.gov/files/documents/nepa_final_ghg_guidance.pdf).

<sup>60</sup> FHWA, *A Performance-Based Approach to Addressing Greenhouse Gas Emissions through Transportation Planning*, December 2013. Acknowledgements section of report front matter. [http://www.fhwa.dot.gov/environment/climate\\_change/mitigation/publications/ghg\\_planning/ghg\\_planning.pdf](http://www.fhwa.dot.gov/environment/climate_change/mitigation/publications/ghg_planning/ghg_planning.pdf).

FHWA, *Handbook for Estimating Transportation Greenhouse Gases for Integration into the Planning Process*, 2013. [http://www.fhwa.dot.gov/environment/climate\\_change/mitigation/publications/ghg\\_handbook/ghghandbook.pdf](http://www.fhwa.dot.gov/environment/climate_change/mitigation/publications/ghg_handbook/ghghandbook.pdf).

h. The target establishment framework proposed in this rulemaking requires that State DOTs and MPOs would establish 2 and 4 year targets that lead to longer term performance expectations documented in longer range plans. Is this framework appropriate for a CO<sub>2</sub> emissions measure?

Several commenters, including the California, Minnesota, and Washington DOTs, and the North Front Range MPO, recommended that the measure have 4- and 20-year targets. These commenters suggested that a 2-year target may be too short to demonstrate significant changes to statewide CO<sub>2</sub> emissions. They said that a 4-year, short-term target would align the CO<sub>2</sub> measure with other national system performance measures and the 20-year long-term CO<sub>2</sub> performance target would align with the long-range planning timeline.

Some commenters suggested targets align with other processes, such as the timing cycles for transportation improvement programs (TIPs) (4 years), long range transportation plans (20 years), and air quality conformity analyses.

The FHWA decided that making the CO<sub>2</sub> measure consistent with the other NHPP performance measures would ease and streamline implementation. Even though a 2-year target is a very short timeframe, it can indicate progress toward a longer term goal and can reflect short-term actions such as operational improvements. Consistent with the other performance measures, for the CO<sub>2</sub> measure, State DOTs must establish both 2- and 4-year targets. The MPOs are subject only to a 4-year target-setting requirement for CO<sub>2</sub> emissions and MPOs must either:

- Agree to plan and program projects so that the projects contribute toward the accomplishment of the relevant State DOT target for the performance measure; or
- Commit to a quantifiable 4-year target for the performance measure for their metropolitan planning area.

In making this decision, FHWA does not discount the role of statewide and metropolitan long range transportation plans in performance management. These long range plans (20 years or more) include long-term expectations for the performance measures. The longer-term performance expectations are particularly important for CO<sub>2</sub> emissions as many reduction strategies, such as integrated land use and transportation planning or provision of new public transit systems, take years to implement or show impacts.

The FHWA also notes that the planning regulations relate directly to the performance management

regulations. The long range (20-year) transportation plans must include the required performance measures and targets (including for CO<sub>2</sub>) and a system performance report that evaluates the condition and performance of the transportation system with respect to the performance targets. The short term (4-year) programming STIPs and TIPs must include a discussion of the anticipated effect of the STIP and TIP toward achieving the performance targets in the long range transportation plans. And for MPOs, the TIP must be designed such that once implemented, it makes progress toward achieving the performance targets in the long range plan.

The relevant regulatory sections are:

- 23 CFR 450.216(f)(1) and (2) and 450.324(f)(3) and (4) require that the long-range statewide transportation plan and the metropolitan transportation plans include a description of the performance measures and performance targets used in assessing the performance of the transportation system and that they also include a system performance report evaluating the condition and performance of the transportation system with respect to the performance targets.

- 23 CFR 450.218(q) and 450.326(d) require that the STIP and TIP shall include, to the maximum extent practicable, a discussion of the anticipated effect of the STIP and the TIP toward achieving the performance targets in the long-range statewide transportation plan and the metropolitan transportation plans. Also, § 450.326(c) requires that the TIP shall be designed such that once implemented, it makes progress toward achieving the performance targets in the metropolitan transportation plan.

State DOTs and MPOs both have substantial flexibility in choosing targets. As with other performance targets for the performance management measures, targets are generally established based both on policy aspirations and on analysis indicating what is believed to be attainable. As such, when establishing their CO<sub>2</sub> emissions targets, State DOT and MPO considerations likely would include these three factors:

(1) Projections of business-as-usual future CO<sub>2</sub> emissions. The U.S. Department of Energy, Energy Information Agency (EIA) provides projections taking into account Federal fuel economy standards and current VMT projections. Some States have revenue forecasting models that project future fuel sales that can be used to project future emissions levels.

(2) Policy goals. Twenty States have State-specific GHG emission reduction targets from statewide climate action

plans and/or State legislation.<sup>61</sup> The U.S. has committed to reduce GHG emissions 26 to 28 percent below 2005 levels by 2025 and 80 percent or more by 2050.<sup>62</sup>

(3) Analysis of what is attainable. For the purposes of target-setting, analyses of the potential effectiveness of various strategies may vary in level of effort and technical capabilities required. Options for analysis include:

- Using published information on the approximate magnitude of emissions reduction that can be expected from different strategies. The FHWA's *Reference Sourcebook for Reducing GHG Emissions from Transportation Sources*<sup>63</sup> provides ranges of emission reductions as well as costs, barriers to implementation, example projects, and co-benefits.
- Using sketch planning or scenario planning tools.
- Using VMT from travel demand models and MOVES.
- Using EERPAT, FHWA's integrated modeling system designed specifically to evaluate strategies for reducing surface transportation GHG emissions.

Note that while the rule requires State DOTs to use the fuel sales-based method for calculating past year CO<sub>2</sub> for national consistency reasons, they may use any variety of analytical methods for target-establishment. In fact, while fuel-sales methods are simpler and more accurate for calculating past CO<sub>2</sub>, VMT-based methods will generally be more helpful in projecting future emissions and analyzing reduction strategies. This is because VMT-based forecasting methods can model changes in transportation demand resulting from various strategies.

i. Should short term targets be a reflection of improvements from a baseline (e.g., percent reduction in CO<sub>2</sub> emissions) or an absolute value?

Many commenters recommended that targets be expressed as a percent change from a certain year. They indicated it may be difficult to grasp the meaning of an absolute number of metric tons of CO<sub>2</sub>. In contrast, decisionmakers and the public can more easily interpret a percent change and understand how it relates to existing State, national, and international GHG goals. It is common practice to express GHG goals as a percent reduction. The State DOTs of

California, Colorado, Delaware, Minnesota, Oregon, Pennsylvania, Virginia, Vermont, and Washington recommended expressing the targets as percent reduction below a 2005 reference year to be consistent with the U.S. GHG reduction goals established under the Paris Climate Change Agreement. The Atlanta Regional Council suggested that CO<sub>2</sub> targets be expressed as percent reductions below what would be achieved from fuel economy standards alone.

The FHWA decided that the measure will be expressed as a percent change from 2017 NHS on-road CO<sub>2</sub> levels. The FHWA agreed with commenters that a percent change provides more meaning and context to decisionmakers and the public than a certain number of metric tons of CO<sub>2</sub>. The FHWA agreed with commenters that a 2005 baseline would be in line with national goals. However, the size of the NHS materially changed after 2005 due to reclassification of roadways under MAP-21. The changes to the NHS, which began in 2012 and have continued in some States, are expected to stabilize by 2017. Using the 2017 reference date avoids the type of significant data adjustment that would be needed if 2005 were used as the reference date. Using 2017 as the reference date for the GHG measure also makes the starting point for the GHG measure more compatible with the first baseline year used in other measures.

j. What data sources and tools are readily available or are needed to track and report CO<sub>2</sub> emissions from on-road sources? What tools are needed to help transportation agencies establish targets for a CO<sub>2</sub> emission measure?

Commenters noted several data sources and tools are readily available:

- Annual fuel sales volumes by State;
- EIA data on CO<sub>2</sub> emissions per gallon of fuel;
- VMT data in HPMS;
- CO<sub>2</sub> emissions per mile of travel based on vehicle type, speed, and operating conditions available in EPA MOVES model<sup>64</sup>;
- Fleet composition from vehicle registration records; and
- Argonne National Laboratory's national Vision model and California's Vision model, which allow States to evaluate vehicle technology, fuel, and efficiency scenarios for meeting air quality and climate goals.

Commenters also noted that the following tools and resources would be helpful:

- Tools and procedures to estimate GHG emissions and establish targets that are aligned with existing tools States and MPOs use in the planning process.
- Tools pre-populated with emissions factors.

- Tools to determine CO<sub>2</sub> targets and understand the probable efficacy of potential emission reduction strategies.

- New air quality calculators that incorporate GHG emissions or revised existing calculators that include GHG emissions.

- Tools that would enable agencies to measure tailpipe CO<sub>2</sub> emissions based on system use, including:

- Enhanced travel demand models for areas not sufficiently covered by existing models and new models that show the synergistic relationship between transportation and land use.
- Assistance developing MOVES inputs and running MOVES.
- Estimates of "business as usual" emissions in target years.

The FHWA has developed a series of tools and resources to assist State DOTs and MPOs in developing and evaluating effective GHG emissions reduction strategies. More information is available at: [www.fhwa.dot.gov/environment/climate\\_change/mitigation/](http://www.fhwa.dot.gov/environment/climate_change/mitigation/). The FHWA will continue to update tools and provide technical assistance. To minimize workloads, FHWA will provide on its Web site the CO<sub>2</sub> per gallon of fuel for all of the common motor fuels. In addition, FHWA will provide look-up tables with national averages of grams of CO<sub>2</sub> per VMT for different speeds for the national average vehicle fleet.

The FHWA recognizes that the measure of CO<sub>2</sub> emissions chosen here—the percent change in tailpipe CO<sub>2</sub> emissions on the NHS compared to the Calendar Year 2017 level—is imperfect. Data is not available to directly measure this, so we have chosen to measure this indirectly by calculating fuel sales and multiplying the associated CO<sub>2</sub> emissions by the proportion of VMT that takes place on the NHS. This method results in a measure that is only partially affected by projects that reduce emissions on the NHS. For example, if there is a significant downturn in the economy and people choose to drive less, this would result in a reduction in the measure. If people choose to drive the same amount, but shift some of their driving to non-NHS roads, this would also result in a reduction in the measure. If gas prices fall temporarily and people drive more, this would result in an increase in the measure. In addition, the measure does not take account of upstream emissions, so if people shift to EVs, the higher upstream emissions associated with this would not be captured. For these reasons, FHWA will, in the future, re-evaluate this measure and consider whether data are available to more directly measure emissions effects of NHS projects

<sup>61</sup> FHWA, *Handbook for Estimating Transportation Greenhouse Gases for Integration into the Planning Process*, 2013.

<sup>62</sup> U.S. Government, "Fact Sheet: U.S. Reports its 2025 Emissions Target to the UNFCCC," March 2015. <https://www.whitehouse.gov/the-press-office/2015/03/31/fact-sheet-us-reports-its-2025-emissions-target-unfccc>.

<sup>63</sup> Available at [http://www.fhwa.dot.gov/environment/climate\\_change/mitigation/publications/reference\\_sourcebook/index.cfm](http://www.fhwa.dot.gov/environment/climate_change/mitigation/publications/reference_sourcebook/index.cfm).

<sup>64</sup> Or EMFAC in California.



undertaken by States or MPOs. If more direct data sources are developed, FHWA may consider revising this measure.

k. How long would it take for transportation agencies to implement such a measure?

Several commenters, including the State DOTs of California, Colorado, Delaware, Minnesota, Oregon, Pennsylvania, Virginia, Vermont, and Washington, suggested that transportation agencies could implement a fuel-based GHG measure in 1 to 2 years and that a VMT-based measure would take 3 to 5 years.

The FHWA has chosen a fuel-based measure that can be implemented within the 1- to 2-year time frame cited by commenters. This is consistent with the timeframes established in this rule (first performance period starts on January 1, 2018, and targets are due in October 2018).

#### l. The FHWA Requests Data About the Potential Agency Implementation Costs and Public Benefits Associated With Establishing a CO<sub>2</sub> Emissions Measure

Some commenters noted that a fuel-based measure would have minimal implementation costs, but that a VMT-based measure would require transportation agencies to dedicate staff to the effort and incur new ongoing costs. Commenters noted that the benefits of the rule would depend on the ambition of State DOTs and MPOs in setting targets and implementing strategies.

The FHWA appreciates the responses submitted on this question and has considered these comments in preparing the rule. Please see the regulatory impact analysis for detailed information on economic costs.

#### 2. Removal of Peak Hour Travel Time Reliability Measure

Several commenters expressed concern that the proposed measures based on vehicle travel times are redundant and overly burdensome. Some suggested reducing the number of measures that rely on travel time in order to reduce the burden on transportation agencies, arguing that having seven metrics based on travel time data is redundant and provides little additional benefit. There were commenters in favor of removing the LOTTR, PHTTR, TTTR, freight congestion, and Excessive Delay measures, respectively. Several commenters suggested replacing the PHTTR measure with the Excessive Delay measure and vice versa.

The measures proposed in the NPRM represented different aspects, but similar types, of performance. The FHWA based the proposed measures on the availability of existing data and feedback from stakeholder sessions early in the rulemaking process. After reviewing the comments, FHWA agreed that the number of measures should be reduced to minimize the burden to analyze data and establish targets and to simplify the method to determine metrics and measures. In this final rule, FHWA has reduced the number of measures that rely on travel time from seven to four. The four measures will be used to assess reliability (both for all vehicles and trucks) and delay experienced by all travelers during peak hours.

Commenters were most critical of the PHTTR measure. Many questioned the usefulness of this measure and raised concerns about the many aspects of the measure. Commenters also discussed the similarities between the PHTTR and Excessive Delay measures, which many felt created an unnecessary complication and added burden. In response to these comments, FHWA consolidated the proposed NHPP PHTTR measures and the CMAQ Excessive Delay measure into one measure under the CMAQ program: Peak Hour Excessive Delay (PHED). Discussion of these changes to the Excessive Delay measure can be found in the Response to Comments Section for subpart G. The rule now weights all but one of the four travel time derived measures (*i.e.*, truck reliability) to reflect the impact of performance on all travelers. Reducing the number of travel time derived measures will still allow for the assessment of reliability and congestion at the State, urbanized area, and national levels.

#### 3. NHPP Reliability

##### a. Reliability—Use of Traffic Volumes Versus People Traveling

Many commenters supported using volume data to weight the LOTTR measure. The NACTO suggested modifying the LOTTR to include transit movement weighted by ridership. The Oregon Metro Council and the Joint Policy Advisory Committee on Transportation suggested including hourly volumes (the same used for the proposed CMAQ Traffic Congestion delay measure) in the calculation for LOTTR. The NJTPA also suggested volumes for LOTTR modifications and proposed using occupancy estimates to weight by person volumes, not just vehicle volumes. Many commenters felt that the proposed measures were too

focused on vehicle delay and wrongly ignore person throughput. The Washington State House of Representatives commented that congestion should be measured on reliability, or whether or not a trip takes the same amount of time from day to day, rather than delay. Focusing on driver delays creates a one dimensional vision of congestion and ignores alternative modes of transportation that people use to travel through a corridor, and reliability would be a better measure to ensure that people can count on a consistent commute day to day, no matter what mode of transportation they use.

Commenters also stated that the NPRM required traffic volumes to be used in the calculation of the CMAQ Excessive Delay measure, but not the NHPP Reliability Measure. The NJTPA states the incorporation of person and goods volumes in the reliability and delay metrics would improve their perspective. The FHWA agrees with these comments and believes that the NHPP Reliability measures would be improved by weighting the metrics with volumes. This change will put a greater emphasis on roadway segments where reliability deficiencies are impacting the greatest number of people using the system. The final rule requires the measure to be weighted by annual traffic volumes, which puts the focus on the most heavily travelled roads.

In the NPRM, FHWA was concerned about the absence of data regarding actual traffic volumes for the level of roadway coverage and granularity needed (entire NHS and 5-minute temporal granularity). The FHWA believed including volume would require actual volume counts every 5 minutes for every NHS road segment, data which do not currently exist. In the final rule, FHWA has decided to use annual average daily traffic (AADT) to weight segments in the calculation of the measure, rather than use them in the metric calculation, the approach rejected in the NPRM. The FHWA maintained that the CMAQ Excessive Delay measure (new Peak Hour Excessive Delay), which applies to fewer entities, apply hourly traffic volumes for each segment.

To account for the movement of people rather than just vehicles in these measures, the measure will also be weighted by area wide/statewide occupancy factors. The FHWA will develop occupancy factors for both metropolitan and statewide areas based on national survey results, such as NHTS. Using both traffic volume and occupancy factors as weights in the calculation of the reliability measure



will allow the measure to reflect the percentage of all people experiencing reliable conditions. The measure will be more sensitive to congestion in areas where there are more person-miles traveled, which FHWA believes is an appropriate way to measure reliability for investment decisionmaking. In addition, in recognition of the evolving ability to accurately measure person throughput and the impact of multimodal travel, FHWA plans to revisit the measures related to reliability and congestion after Fall 2018 when FHWA's multimodal research study is expected to be completed.

**b. Applicability of the Non-Interstate NHS NHPP Reliability Measure**

The FHWA received several comments regarding the applicability of the NHPP non-Interstate NHS reliability measure, including restricting the measure to urbanized areas or to areas with populations of at least 1 million. These commenters argued that narrower applicability would reduce the cost and burden of data analysis on smaller, rural States.

The Oregon Metro Council and the Joint Policy Advisory Committee on Transportation commented that FHWA should apply the travel time reliability measures to the entire NHS.

The FHWA acknowledges that rural roadways may only have limited reliability issues, but such problems can and do occur as a result of weather events, special events, tourist attractions, etc. The FHWA believes it is important to understand when and where reliability problems on both urban and rural segments of the non-Interstate NHS occur. The FHWA analyzed the burden on State DOTs and MPOs with rural and urban NHS networks and found that the level of change needed to justify the cost of compliance is achievable. The FHWA is committed to provide technical assistance and support to State DOTs. In addition, FHWA is interested in working with State DOTs and MPOs to lead a pooled fund effort to acquire resources to provide services and tools to minimize the resource demands to process and analyze data.

**c. Excluding Weekends From LOTTR Calculations**

Several commenters questioned the inclusion or exclusion of weekends in the LOTTR measure, arguing that exclusion of certain days should be consistent across all travel time-based measures. The Delaware DOT commented that in resort areas, Fridays should be considered weekends and

should not be included in LOTTR calculations.

The FHWA evaluated the impact of including weekends in the calculation of the reliability metric, finding that for Interstate roadways, the maximum LOTTR value typically occurred during the weekday or was similar during both weekdays and weekends. However, for non-Interstate NHS roadways, including weekend travel times resulted in reliability measures that were 5 percent to 7 percent worse than measures derived solely from weekday travel times. These data indicate that weekend travel impacts reliability for a sufficient portion of the system to warrant the inclusion of weekends in the metric calculation. System performance should be assessed during times of most use of the NHS system, which in many cases includes the weekend daytime periods. In many urban areas and areas with special events, there can be reliability issues even on the weekends. Including weekends will allow DOTs and MPOs to more fully monitor segments with reliability issues and monitor how they change year-to-year.

**d. Time Periods for LOTTR Calculation**

The FHWA received eight comments on the use of shorter time periods for the LOTTR calculation (e.g., individual hours rather than 6 a.m. to 10 a.m.). The AASHTO and others noted that the time period proposed in the NPRM highlights inconsistency in travel times within the time period bins rather than from day to day. This methodology could lead to segments reported as unreliable according to the LOTTR measure, while they may be considered reliable when using trip based reliability. The NYSAMPO noted that the longer peak periods mask the occurrence of reliability problems. The New Jersey DOT and NJTPA stated that the large time periods for analysis would be appropriate if people could shift their commute times within the period, but since most people cannot, the time periods are too long. The Southeast Michigan Council of Governments requested flexibility to report the highest values for each individual hour within the peak periods rather than a ratio accounting for all 4 hours. The Oregon Metro Council proposed a formula-based method to determine each agency's time periods to avoid mixing peak and off-peak travel time observations in the denominators of key metrics, which would obscure cross-regional comparison.

The FHWA recognizes that there are many approaches to measuring reliability and related congestion measures. The FHWA carried out a

number of analysis runs using travel time data for a mix of States and urbanized areas to evaluate the impact of reducing the number of time periods below the four that were proposed and shortening the duration of time periods to eliminate the "tails" where traffic tends to build up and reduce. The results from these runs showed that a sufficient number of roadway segments exhibited unreliable travel times during the midday and weekend time periods. In addition, FHWA found that shortening the time periods (to reduce "tails") resulted in similar outcomes as compared to the proposed time periods (less than 1 percent difference). The FHWA retained the four proposed time periods (AM peak, midday, PM peak, and weekend) and the duration of each time period. In this final rule, the 14 hours are broken down into four time periods: (1) Weekday mornings (6 a.m. to 10 a.m.); (2) weekday afternoons (4 p.m. to 8 p.m.); (3) midday (10 a.m. to 4 p.m.); and (4) weekends (6 a.m. to 8 p.m.). The FHWA believes that evaluating the hours when the system is most frequently in use, defined as 6 a.m. to 8 p.m. daily, is the best approach to assess reliability problems. The FHWA analyzed suggestions from commenters that showed there are reliability problems on certain sections of roadways during all of those time periods (with more occurring during peak periods). The FHWA also assessed if the longer time blocks (4 to 14 hours) proposed in the NPRM measured variability across the time period instead of variability from day-to-day at the time period throughout the year. Commenters were concerned that the variability in travel times at the "tails" of the longer time periods would control the reliability metric. The FHWA found no significant difference (results within 1 percent) between using the proposed time blocks to using 1-hour time blocks over the same time period (i.e., comparing one block of 6:00 a.m. to 10:00 a.m. to 4 time blocks each 1 hour in length from 6:00 a.m. to 10:00 a.m.). For this reason, FHWA decided to maintain the time blocks proposed in the NPRM in the final rule.

**e. Use of 1.50 Threshold To Determine Reliable Segments**

Several commenters expressed a desire to establish different thresholds for urban and rural roadways and based on segment length. These commenters explained that travelers tend to view the reliability of their travel based on a full trip and not the individual short segments that make up the trip. They suggested that the final rule include different thresholds for different TMC

lengths, since they could vary by more than 10 miles in length.

The NJTPA, TRANSCOM, AMPO and others expressed concern about the use of pass/fail threshold noting that incremental improvements in reliability would not be recognized until the LOTTR dropped below 1.50. These commenters argued that the use of a “sharp” cutoff threshold could bias investment decisions, encouraging State DOTs and MPOs to focus only on those segments that are close to the 1.50 threshold, even though optimal improvement may be on segments with much higher LOTTR values.

The FHWA appreciates and acknowledges these comments and considered alternative approaches to the proposed method. The FHWA ultimately elected to retain the approach to utilize a 1.50 threshold to reduce complexity in the calculation method. An alternative approach would have required varying threshold levels for different segments and the inclusion of more graduated levels of reliability, which FHWA felt would unnecessarily complicate the measure calculation and reporting process. The FHWA encourages State DOTs to discuss how investment strategies have resulted in incremental improvements to the reliability of the system in their Biennial Performance Report. In addition, FHWA has revised the Truck Reliability measure so that it is a weighted average of all segment level reliability ratios that will reflect all changes in reliability levels.

#### *D. Subpart F—National Performance Management Measures for Freight Movement on the Interstate*

##### **1. Removal of Truck Congestion Measure**

In the NPRM, FHWA proposed two measures of freight movement on the Interstate under 23 U.S.C. 150(c)(6): Truck Travel Time Reliability (TTTR) and Truck Congestion. Many commenters felt that the 50 mph speed threshold to define congestion for the Percent of the Interstate System Mileage Uncongested proposed in the NPRM is unreasonable and should be eliminated. Suggestions included:

- Making the threshold more flexible for each reporting entity
- Using some other variable such as population density
- Changing to a lower value such as 35 mph
- Changing to a percentage of the posted speed limit
- Making the threshold a function of population density, lanes, or ADT
- Rather than using thresholds, providing credit for incremental improvements.

The FHWA eliminated the performance measure for Percent of the Interstate System Mileage Uncongested; the TTTR Index is the only freight-specific performance measure adopted in this rule. The FHWA recognizes that the use of a single speed threshold as compared to an annual average of speed would not be an effective measure to assess uncongested conditions. Changing the measure to consider the factors expressed through comments would be complicated and overly burdensome to implement.

##### **2. Consistency Between All-Vehicle and Freight Reliability Measures**

Many commenters provided suggestions to better align the proposed reliability measure for the NHPP that reflects the travel of all vehicles and the proposed freight reliability measure that reflects the travel of trucks. The suggestions raised by commenters are discussed below and, in general, addressed a desire to: Remove the freight reliability measure, better align time periods with the two reliability measures, reconsider the longest travel time considered in the metric, and reconsider the threshold to define reliable travel time.

Many State DOTs and MPOs commented that all-vehicle and freight reliability measures should be consistent since trucks and cars are travelling on the same roads and improving reliability on a roadway benefits all vehicle types. Commenters noted that the NPRM uses data from the all vehicle travel time dataset to complete missing truck data in NPMRDS. Several State DOTs and MPOs also commented that separate measures created a perception that freight was being prioritized over passenger vehicles. Several commenters suggested that the proposed freight performance measures focus on peak period travel times or peak period congestion, with some suggesting focusing on corridors or bottlenecks and aggregating the data into 15-minute intervals and longer segments. If the intent is to show the off-peak freight flows, then FHWA should provide further guidance or focus the measure only on off-peak periods. If this is not the intent then there should not be two separate reliability measures. In addition, some commenters suggested that the measure evaluate peak seasonal performance rather than annual averages for freight facilities serving agricultural regions. Other commenters suggested that the final rule consider the use of peak periods and adding a fifth time period from 8 p.m.–6 a.m. daily. As with the LOTTR, commenters suggested

that the TTTR measure be computed separately for each single hour within the proposed time period and the measure should be the hour with the lowest percent reliable for the time period of interest.

The AASHTO and several State DOTs and MPOs commented that they do not agree with using the 95th percentile travel time for freight. Many questioned the justification for use of the 95th percentile, with some noting that it is too stringent. In response, some commenters, including AASHTO, AMPO, TRANSCOM, and several State DOTs suggested using the 80th percentile to be consistent with the LOTTR measure for all vehicles. The NARC and others suggested allowing State DOTs and MPOs flexibility to set the threshold. Other commenters did not specify the percentile, but requested that the percentile chosen be consistent with the all vehicles measure or that FHWA provide a rationale for why the thresholds are different. The AASHTO, along with Washington, Oregon, and Connecticut DOTs and Nebraska Department of Roads agreed with using the 50th percentile travel time as the normal truck travel time for the reliability measure. The FHWA considered commenters’ suggestions, and in particular, FHWA assessed the need for separate:

- Travel times—all vehicles and trucks;
- time periods—6 a.m. to 8 p.m. and 24 hours a day; and
- percentile to represent the longest travel times—80th, 95th, or other percentile.

In addition, FHWA considered the utility of using a 1.50 threshold as an indicator of reliable travel time performance, an issue that was raised for both freight and all vehicle measures.

As a result of this assessment, FHWA concluded that a separate reliability measure is needed to assess freight movement on the Interstate, but revised the measure to address comments about the 1.50 threshold and periods of analysis. A separate freight reliability measure will more accurately reflect the performance of the Interstate system as perceived by shippers and suppliers as the measure considers factors that are unique to this industry such as the use of the system during all hours of the day and the need to consider more extreme impacts to the system in planning for on-time arrivals. The FHWA believes that these changes simplify the calculation and addresses the concerns regarding the higher standard of performance proposed for truck reliability.

In addition to the data requirement changes discussed previously (*i.e.*, the use of 15 minute time periods and longer allowable segment lengths), FHWA simplified the truck reliability calculation by simplifying the method to utilize all-vehicle travel times when truck travel times are missing and using consistent time periods to those used for the all vehicle reliability measure. The FHWA retained the requirement to use truck travel times as the basis for the metric calculation to more accurately depict how freight is moving on the Interstate system as FHWA has consistently found the truck travel times to be slower than all vehicle travel times in the NPMRDS data set. The FHWA revised the truck reliability measure to use 5 time periods, 4 of which are used in the all vehicle reliability measure. These time periods cover 24-hours, broken into AM peak (6 a.m. to 10 a.m.), mid-day (10 a.m. to 4 p.m.), and PM peak (4 p.m. to 8 p.m.) periods for Mondays through Fridays, weekends (6 a.m. to 8 p.m.), and overnights for all days (8 p.m. to 6 a.m.). Aligning the time periods to the all vehicle time periods simplifies the analysis. Including all times recognizes the flow of freight during all hours of the day and also considers freight shippers that attempt to plan routes that optimize travel time and, when possible, attempt to avoid peak hours in major congested areas. The FHWA believes that the 5th time period is needed to consider travel times during overnight hours as shippers and suppliers rely on the system to support on time delivery needs 24-hours a day.

In response to comments, FHWA compared metric and measure results using the 80th percentile and the 95th percentile travel times. This analysis showed minimal differences in the reliability measure for the Interstate System using the 80th and 95th percentiles; however, metric results were considerably different at the roadway segment level. The FHWA believes that the 95th percentile travel time needs to be considered in the freight measure to account for the events that could impact on time delivery as shippers, carriers, and receivers desire on-time/just-in-time delivery of goods and plan their trips by building in enough time to meet delivery requirements. For these reasons, FHWA elected to maintain the 95th percentile in the truck reliability calculation.

The FHWA appreciates the concerns raised by commenters regarding the different standard used for freight and all vehicles measure and agree that, as proposed, this difference would put a priority on the freight metric in

decisionmaking. To address this concern, FHWA removed the 1.50 reliability threshold. As in the NPRM State DOTs will still report a reliability ratio (comparison of the 95th and 50th percentile travel times) for individual segments of roadway. However, as a result of the removal of the 1.50 threshold, FHWA will not assess if the roadway segment (as expressed by the reliability ratio) is providing for “reliable” travel times. The new measure is designed to use the reliability ratio of each segment, using the worst reliability ratio of all 5 time periods, to calculate an overall average truck reliability of the entire Interstate system. The Interstate system will be represented with one reliability ratio for trucks that will be used by State DOTs and MPOs to establish targets. State DOTs and MPOs will use the roadway segment level reliability ratios, considering the time periods where reliability problems are exhibited, to identify strategies that can be implemented to improve the overall reliability ratio for the Interstate system. The new measure can be used as an indicator of the travel time variability considered by shippers and suppliers. The change also allows for incremental improvements to be recognized in the measure outcome, which was a concern raised by many commenters in the design of the proposed reliability measures.

### 3. Relationship Between the Freight Measure Provisions and the National Freight Program and State Freight Planning

The California Association of Councils of Government requested that the rulemaking clarify the relationship between the freight measures and the FAST Act rulemaking on Interim National Multimodal Freight Network, particularly with regard to FAST Act freight funding programs, including FASTLANE.

The Connecticut and Texas DOTs noted that the rule does not outline how the proposed critical urban and critical rural freight corridors, required to be developed under FAST Act, will be integrated into the NPMRDS dataset. There is concern that this integration will require substantial effort and resources by State DOTs.

The Nebraska and Texas State DOTs commented that there is no need to establish additional reporting requirements for freight bottlenecks because bottlenecks and performance measures will be addressed in the State’s freight plan required in 49 U.S.C. 70202 and thus a separate report seems redundant. The Texas DOT suggested

that reporting on multimodal bottlenecks can be done by including a section in a State freight plan.

The FHWA recognizes that the FAST Act made a number of substantive changes in the freight area, including establishing two new funding programs. These new programs did not change the requirement under 23 U.S.C. 150(c) to assess freight movement on the Interstate System. One of the new funding programs is the National Highway Freight Program to improve the efficient movement of freight on the National Highway Freight Network (NHFN). The statute requires FHWA to establish the NHFN, which consists of the following components: The Primary Highway Freight System (PHFS), Critical Rural Freight Corridors (CRFC), Critical Urban Freight Corridors (CUFC), and those portions of the Interstate System that are not part of the PHFS. Therefore, the NHFN includes the entirety of the Interstate system—the same system used to assess freight movement in this rule. Although NHFP funding eligibility is limited to projects on the PHFS, CRFC, and CUFC (which may not include the full Interstate System in a State), FHWA does not believe that this should limit the applicability of the measure in the rule to assess freight movement. Other program funding, such as the National Highway Performance Program, may be used for projects to improve both freight performance on the entire Interstate System.

The NPMRDS includes travel times for the full Interstate System. State DOTs and MPOs will have the data they need in the NPMRDS to meet the freight measure requirements in this rule. There is no requirement for State DOTs and MPOs to supplement the NPMRDS with travel time data to represent roadways on the NHFN that are not on the Interstate System.

The performance management statute requires State DOTs to biennially submit performance reports (*i.e.*, State Biennial Performance Reports in § 490.107) that include freight bottleneck analyses. A good source for these analyses is the State freight plan under 49 U.S.C. 70202, which is required by the FAST Act in order to obligate NHFP funding after December 4, 2017. There can be coordination between the bottleneck reporting for performance measures and freight plans; however, the timing for the State Biennial Performance Reports and 5-year updates to State freight plan is different. In recognition of this similar requirements, FHWA will allow State DOTs to refer to the State freight plan bottleneck analysis in their State Freight



Plan to meet the freight bottleneck reporting requirements of 23 U.S.C. 150(e) if the freight plan has been updated since the previous State Biennial Performance Report.

#### 4. Weighting by Truck Volume

The Virginia and Minnesota DOTs, Oregon Metro Council, Metropolitan Council, and the Joint Policy Advisory Committee on Transportation recommended weighting the reliability measures by applicable vehicle volumes. The Oregon Metro Council and Joint Policy Advisory Committee on Transportation also provided details in their comment on how to weight the reliability measure by volume and recommended FHWA support and fund a better means of obtaining vehicle classification volume data.

The AASHTO and several State DOTs opposed weighting the measures by truck volumes, because it would create additional work to calculate the measure.

The FHWA considered the comments suggesting that the freight reliability measure be weighted by truck volumes. Putting a lesser weight on a segment of the Interstate that is avoided by freight shippers due to poor performance would be contrary to the intent for the performance measure.

The reasoning for weighting, as noted by several commenters, is that it would more strongly emphasize sections of roadway that carry higher truck volumes. The FHWA evaluated the impact of weighting by truck volumes and concluded that for the Interstate System, to which this measure only applies, providing for reliable travel times is equally important across the full system, regardless of the level of use by trucks. If the freight performance measure is applied to a range of roadway functional classifications other than the Interstate System, then weighting the measure for truck volume would be more important in determining which roadways serve as major freight routes.

The FHWA further concluded that some shippers monitor the performance of the roadway system and avoid segments of the Interstate when conditions could impact on time delivery. The FHWA's analysis of Interstate corridors showed that, in some cases, areas with poor reliability tended to have lower truck volumes, indicating that the practice of avoiding segments to achieve on time delivery could impact the effectiveness of the measure if it were weighted by truck volumes.

For these reasons, the freight performance measure will not be weighted by truck volumes.

#### 5. Vehicle Classes

The AASHTO and New York State Association of Metropolitan Planning Organizations recommended that FHWA define freight as combination trucks (FHWA classes 8–13). The AASHTO mentioned that this group of vehicles is representative of most significant freight activity on Interstates. The AASHTO also recommended that the NPMRDS only include the data for those classes. The Connecticut DOT recommended that FHWA define freight as combination trucks (FHWA classes 8–13) and require that NPMRDS dataset only include those classes. The Delaware DOT noted that NPMRDS only includes certain classes of trucks and questioned whether this is accurate.

The FHWA concluded the comments do not require a change to the rule. The data set includes a sample of fleet vehicles. A range of trucks is included, but data are more heavily sampled toward Interstate truck traffic, which would include FHWA vehicle classes 8–13. The FHWA will provide additional guidance on what vehicle classes are included in the NPMRDS dataset.

#### 6. Definition of Freight Bottlenecks

Many commenters noted that the 50 mph speed threshold to define congested conditions for freight movement was not an effective indicator of “freight bottleneck.” A freight bottleneck can result from a combination of features, including capacity constraints, highway interchanges, locations with geometric constraints, bridges with clearance or weight limitations, or steep grades. Also, significant bottlenecks to freight movement are often off the Interstate and the NHS, such as arterial streets, intermodal connectors, and first and last miles to freight origins and destinations. The AASHTO and a number of agencies suggested the term “freight bottleneck” be changed to “truck freight bottleneck” for clarification since it only applies to truck traffic, and not to other modes such as rail or waterway.

The definition of “freight bottleneck” has been changed to “truck freight bottleneck” and revised to provide a general description that allows State DOTs to determine where truck freight bottlenecks are occurring based upon individual context. The definition also does not limit the location to the Interstate. Each State DOT will need to define what constitutes bottlenecks based upon the specific context of the State and the local impediments that

each State experiences with regard to freight movement.

#### *E. Subpart G—National Performance Measures for CMAQ Program—Traffic Congestion*

##### 1. Excessive Delay Measure

##### a. Applying Peak Hours to Excessive Delay Measure To Create Peak Hour Excessive Delay

The Response to Comments section for subpart E describes FHWA's rationale for consolidating the PHTTR measure and Excessive Delay measure from the NPRM into a new CMAQ Traffic Congestion measure: Peak Hour Excessive Delay (PHED). The PHED measure applies peak hours to the original Excessive Delay measure in order to focus on traffic congestion experienced during peak hours in applicable urbanized areas. Other aspects of the original Excessive Delay measure were also changed in response to comments, as explain in the following sections.

##### b. Peak Hour Time Periods

Originally, these comments related to the peak hours defined in the PHTTR measure. The FHWA has included this discussion of peak hour comments under the CMAQ Traffic Congestion section because the peak hour designation now applies to the Excessive Delay measure. The AASHTO requested the inclusion of 9:00 to 10:00 a.m. and the Hampton Roads Transportation Planning Organization requested 3:00 to 4:00 p.m. Other commenters requested that FHWA maintain consistency between the hours used in the LOTTR and PHTTR measure.

The FHWA agrees that consistency in the time periods for all travel time measures would simplify the approach to calculate the measures and reduce the amount of data needed for the calculation of all measures. The FHWA also recognizes that different areas experience peak periods at different times of the day. For this reason, FHWA has adjusted and provided flexibility in defining the time periods for the PHED measure to be more consistent with the reliability measures. The FHWA felt that it was important to keep the time periods within 6 a.m. and 8 p.m. to ensure for consistency in the all of the measures at a national level. The adjustments in the final rule added a 4th hour to both the morning and afternoon peak periods. The morning period has been extended to 10 a.m. and to provide flexibility to State DOTs and MPOs, two options have been provided to expand the afternoon period—starting earlier to

begin at 3 p.m. or extending later to end at 8 p.m.

#### c. Traffic Volume Profiles

In the NPRM, FHWA required State DOTs and MPOs to develop hourly volumes based on actual vehicle counts or AADT. Several commenters were concerned that traffic volume data may not be accurate at the granularity required in the NPRM and suggested FHWA fund better volume data collection if data collected by State DOTs and others are not adequate.

The commenters also requested more information about developing hourly volume profiles from actual vehicle counts or AADT. Some commenters suggested FHWA take AADT information from each State's HPMS submittal and develop traffic volume profiles by time of day and day of the year at a 5-minute bin level<sup>65</sup> for each reporting segment or make traffic volumes available in the NPMRDS data set so State DOTs and MPOs could calculate average daily vehicle hours of delay.

The FHWA has reduced the number of hourly volumes that need to be estimated to just the peak hours (*i.e.*, 8 hours daily), requiring only peak hour factors to be used to estimate volumes. The FHWA will provide guidance on appropriate methodologies for estimating the hourly volumes for use in this measure.

#### d. Person Throughput Versus Vehicle Throughput

The FHWA received thousands of comments in favor of making the PHTR more person-focused. The Southwest Energy Efficiency Project, Conservation Colorado, and the National League of Cities suggested using average vehicle occupancy and transit ridership to measure person-hours of excessive delay. The Virginia DOT suggested that the National Transit Database (NTD) could provide data on transit vehicle/bus occupancy, while default values could be used for vehicle occupancy where no data is available. The COMPASS stated that a road mileage-based measure can be counterproductive and encouraged FHWA to measure impacts in terms of people instead. The AASHTO and the Maryland DOT cited both the National Household Travel Survey (NHTS) data as a good representation of actual vehicle occupancy and the Census Transportation Planning Products program that develops robust work-

based trip data. With these data sources, the highway delay metric could be normalized by the number of workers commuting by car.

As with the NHPP reliability measures, FHWA agrees with these comments and believes that the PHED measure would be improved if it represents the cumulative delay of all people using the NHS and not just the delay experienced by vehicles. The FHWA believes that this approach will encourage the improvement of corridors that have higher person throughput. For this reason, the PHED metric in the final rule requires the use of average vehicle occupancy (AVO) factors for cars, buses, and trucks and hourly traffic volumes to calculate person-hours of excessive delay. The FHWA recognizes the variations in AVO among and within urbanized areas and the challenges in obtaining segment-level AVOs. Therefore, to support this approach, FHWA will establish AVO factors for State DOTs and MPOs to use for each applicable urbanized area using the National Transit Database for buses and national surveys, such as the American Community Survey, for cars. The FHWA also recognizes that urbanized areas may have more specific AVO data, and the final rule provides flexibility for State DOTs and MPOs to substitute these data.

#### e. Thresholds

The FHWA received many comments disagreeing with the selection of the 35 mph threshold for freeways and 15 mph threshold for other NHS roadways. Commenters noted that these thresholds do not adequately reflect different circumstances across the country and, in particular, urban areas. Additionally, AASHTO and the Connecticut and Washington DOTs warned that States may have an incentive to focus a project on a reporting segment that is just slightly over the set thresholds instead of the areas that need it the most in order to impact the final number of hours of excessive delay.

Commenters were also concerned that information about the Functional Class of each segment may not be available in HPMS or NPMRDS, and that this could make assigning speed thresholds to different roads challenging. Commenters requested various changes, including using 50 or 60 percent of the posted speed limit (PSL) and leaving the speed threshold to be set by the State DOTs or MPOs.

The FHWA agrees that the use of absolute thresholds may not be appropriate for all areas and that it would be more appropriate to use a threshold based PSL provided this

threshold does not exclude speeds that have been demonstrated to generate emissions that adversely impact air quality. The Washington State DOT conducted analysis on the optimal travel speed to maximize throughput for its State highways and determined that the optimal flow speed was roughly 70–85 percent of PSL. Speeds in this range would have optimal spacing between vehicles while speeds less than 70 percent of the posted speed limit are considered congestion. Speeds less than 60 percent of the posted speed limit are considered to be severe congestion by Washington State DOT. Additionally, FHWA found in previous analysis that emissions rates in grams per mile for criteria pollutants are typically higher at lower speeds (*i.e.*, 0–20 mph).<sup>66</sup> The FHWA believes that a 20 mph speed threshold connects traffic congestion to criteria pollutants. At speeds higher than 20 mph, emissions are significantly lower.

As a result, FHWA has revised the excessive delay threshold in the final rule to be 60 percent of PSL, with a minimum limit of 20 mph. The 60 percent of PSL threshold was selected based on comment suggestions, and the limit of 20 mph was selected based on speed levels that have been associated with emission impacts on air quality. This speed threshold applies to all Functional Classes of roadways, removing the need to identify the Functional Class of each segment. The FHWA recognizes that PSLs are not provided in the NPMRDS dataset. The FHWA will make provisions within the HPMS to capture PSL as a field that can be populated for the full extent of the NHS. The FHWA encourages State DOTs to report PSLs for all NHS segments in the HPMS. The FHWA believes it is important for State DOTs and MPOs to collect and report posted speed limit to understand operating expectations of the NHS.

#### f. Use of Population for Normalization

The AASHTO and several State DOTs expressed concern over the per capita denominator in the Excessive Delay Per Capita measure, stating that it inaccurately assigns excessive delay to all people in all urbanized areas, rather than just the highway drivers who are impacted. The commenters further argued that urbanized areas with high levels of Interstate through traffic will have misleadingly high values because the delay is being experienced by

<sup>65</sup> The FHWA has changed the time bins to 15 minutes for the final rule, but the comments reflected the 5 minute bins proposed in the NPRM.

<sup>66</sup> ICF for FHWA, *Multi-Pollutant Emissions Benefits of Transportation Strategies*, 2006. [https://www.fhwa.dot.gov/environment/air\\_quality/conformity/research/mpeb.pdf](https://www.fhwa.dot.gov/environment/air_quality/conformity/research/mpeb.pdf).



travelers from outside the urbanized area. The commenters suggested that the measure be normalized by commuters using a personal vehicle on the roadway network. Furthermore, the Connecticut and Texas DOTs, and AASHTO commented that the proposed excessive delay measure would produce misleading measure trends when using incomplete data and when no imputation is used. The AASHTO and WSDOT recommended that FHWA divide annual excessive delay by the estimated commuter population rather than overall population to get a more realistic idea of how the people experiencing the delay are affected.

The Atlanta Regional Commission suggested that the congestion measure should be scaled on observed or estimated travel demand (e.g., peak period person throughput, number of peak period trips, peak period VMT). The travel demand also could be gauged in multiple levels: NHS travel demand only, total vehicle travel demand (beyond the NHS), or even total travel demand (e.g., number of peak period trips occurring across all modes). The commenter recommended that HPMS data on annual VMT by functional class could be used. The Delaware DOT urged that FHWA use an estimate of how far people travel to work, while the Delaware Valley Regional Planning Commission recommended that the annual hours of excessive delay per capita should not be based upon total population, but rather should be limited to commuters using a personal vehicle on the NHS roadway network during the time periods it is being measured (i.e., morning and evening peak periods). The Georgia DOT suggested FHWA use Annual Hours of Excessive Delay per thousands or millions.

In response, FHWA compared different methods to normalize the measure in areas that rely heavily on highways and others that provide several modes of transportation. The FHWA found that population was as effective as other methods to normalize the measure and found that, in areas where travelers tend to use non-highway transportation modes, the measure did not unfairly bias the outcome in the area's favor. In addition, population data are readily available in national data sources. For these reasons, FHWA retained the use of population in the final rule to normalize the measure. The FHWA feels that other approaches to normalize the measure would add unnecessary complication to the method. The FHWA plans to revisit this measure after the completion of its multimodal research study in Fall 2018.

g. Census Annual Population Estimates in Lieu of Decennial Values

Several commenters commented on the proposed methodology for the traffic congestion performance measure, which uses the population in the area to develop a "per capita" estimate. The Illinois DOT claimed that using the per capita denominator for the Total Excessive Delay per Capita overestimates the users of the NHS System. The North Jersey Transportation Planning Authority recommended using the most recent population estimate for the urbanized area instead of the decennial values. The Texas DOT stated that using the most recent U.S. Decennial Census (i.e., 2010 population numbers that are already 6 years old) for reporting until 2022 or 2023 when the 2020 Census is available will have a negative impact on the urbanized areas of Texas with regard to "per capita" metrics.

The T4A requested discussion in the final rule of how State DOTs and MPOs could use population estimates from 5-year ACS estimates for each-year reporting cycles. The commenter also stated the importance of normalizing the excessive delay measure by dividing the calculation by the total population for the State or MPO, allowing all transportation users to be accounted.

The FHWA agrees with the use of annual population estimates as opposed to the decennial census populations to normalize the excessive delay measure. Using annual estimates will more accurately account for population shifts in large urban areas that are not captured through the decennial census. For this reason, FHWA has revised the approach to determining the population in the final rule for both the PHED per capita measure and to determine urbanized areas that are applicable to the CMAQ Traffic Congestion measures (both PHED and non-SOV Travel). As suggested in the comments, FHWA is requiring annual population estimates to be determined using U.S. Census estimates (i.e., most recent ACS 5-year estimate). The most recent annual population estimate as of one year before the Baseline Performance Report is due is to be used to determine urbanized areas that are applicable to the CMAQ Traffic Congestion PHED measure. These areas will remain applicable for the full duration of the performance period, regardless of population changes that may occur within the period (4-year time period). The FHWA feels that keeping the applicable areas for the duration of the performance period is important to simplify the implementation of the

requirements. The most recent annual population estimate will be used each time the PHED per capita measure is calculated. The FHWA believes that this approach responds to the concerns regarding population shifts in large areas.

The FHWA does not agree that the populations should be determined for specific times of the day or days of the week as suggested by some commenters due to the complexity of implementing such a method.

#### h. Outliers in Speed Data

The Oregon and Washington State DOTs commented that since the null and outlier procedure for the excessive delay measure was not the same as the system performance or freight measures, they assumed that for the excessive delay measure, 5-minute bins with no recorded travel times as well as those data points over 300 seconds will be excluded. The State DOTs recommended that the procedures for all outlier and null data be consistent in the final rule. The AASHTO expressed concern over the excessive delay calculation, which is compounded by outliers in the dataset. The AASHTO argued that the proposed descriptions of equations can create the opportunity for unstable calculations; that is, that the delay may be grossly overestimated on the interplay of the length of each segment, the evaluation period, and the speeds. This could lead to overestimates of delay during periods of very low speeds or road closures if volume limiting is not used. The AASHTO stated that this instability can be addressed with maximums of delay that relate to the length of reporting period. The AASHTO further stated that the outliers in NPMRDS further compound this issue; however, a gapless or imputed data set would not be immune to the volume problems.

The FHWA evaluated the impact of applying an outlier threshold to the final travel time derived measures and found that the effect of excluding very slow and very fast speeds on the outcome measures did not warrant the burden that would be required to remove outliers. Although the removal of outliers had the greatest effect on the excessive delay measure (as this measure cumulates all excessive travel times), the use of allowable techniques, such as path processing, to smooth out point probe sources will reduce the occurrence of outliers in the data set. For this reason, FHWA removed the requirement to exclude outliers from the travel time data set.

In the NPRM, FHWA limited the travel time for a given segment to 300



seconds, equivalent to 5 minutes. This ensured that excessive delay could not exceed the length of the time period. Since 15 minute bins are now used instead of 5 minute bins, FHWA changed this maximum to 900 seconds. Since there is no outlier removal, all 15 minute bins with travel times will be used and subject to the 900 second limitation. The FHWA encourages State DOTs and MPOs to share their strategies using volume limiting techniques to address concerns when extremely slow speeds exist. The FHWA in the final rule allows removal of any travel time data in the calculation that could have been recorded with the roadway was closed.

## 2. Decision To Include a Multimodal Measure

Tens of thousands of commenters, through campaigns from T4A, American Heart Association, and others, raised concerns about the vehicle-focused nature of the 8 measures proposed in the NPRM. Many asserted that determining the performance of the NHS and the impact of congestion relies on an understanding of the entire surface transportation system, including all available modes of travel. Commenters explained that considering pedestrians, bicyclists, public transit riders, and other travelers in transportation decisions, provides a fuller picture of system performance, encourages policies that reduce traffic congestion, and helps meet the goal of efficient investment of Federal transportation funds. They asserted that these transportation modes, while often local in implementation and reach, deserve recognition in a national performance measure because they contribute to transportation efficiency and reliability, promote public safety and health, improve the livability and walkability of urban neighborhoods, improve environmental sustainability, and reduce costs for the travelling public. One commenter noted that the vehicle-focused approach in the NPRM disadvantages low-income communities where vehicle ownership rates are often lower compared to suburban and rural areas.

Commenters discussed multimodal benefits generally, but also specifically in the context of traffic congestion. Many argued that non-SOV modes should be explicitly included in a measure to reflect emissions avoided by these modes. Commenters suggested making the NHPP Reliability and CMAQ Excessive Delay measures more multimodal by including buses in average vehicle occupancy. Many commenters expressed support for a

new, separate multimodal congestion performance measure. Many commenters provided suggestions for the design of such a multimodal measure, including:

- Non-single occupancy vehicle mode share
- Percent of NHS mileage with a transit alternative to driving
- Ratio of transit passenger miles traveled to vehicle miles travelled
- Shorter multimodal journey-to-work travel time than average
- Number of jobs accessible within a given time budget
- Avoided delay provided by public transportation

Commenters suggested many possible data sources that could be used to calculate a measure, including the American Community Survey (ACS), National Household Travel Survey (NHTS), National Transit Database (NTD), General Transit Feed Specification (GTFS), regional vehicle capacity, and pedestrian and bicycle counts (e.g., from the Travel Monitoring Analysis System (TMAS)). One commenter identified planning tools State DOTs could use to determine the impact of multimodal transportation, including the TDM Effectiveness Evaluation Model (TEEM), TDM Assessment Procedure (TDMAP), Trip Reduction Impacts of Mobility Management Strategies (TRIMMSTM), and Project Evaluation Toolkit (PEToolkit). Commenters suggested FHWA leverage existing datasets and data collection efforts and work with partners such as the Transportation Research Board, the U.S. Census Bureau, and FTA to enhance existing datasets or develop a multimodal dataset.

In the NPRM, FHWA noted the data limitations that constrain creating and requiring a multimodal performance measure and presented specific questions to better understand what could be implemented in this final rule. A number of the measures suggested by commenters still present significant challenges in national data collection and analysis. The FHWA recognizes that robust multi-modal system performance measurement requires additional research and development, and is engaged in a significant research project, Multimodal System Performance Measure Research and Application, to identify more ideal multi-modal system performance measure(s) and the data required to calculate them. However, commenters also provided more information to FHWA to better understand how some State DOTs and MPOs may have other data available to measure modal share more accurately at

a local level. The FHWA now believes that nationally consistent data, as well as these more detailed local sources, make it possible to create a basic assessment of multimodal system performance through the measure of the portion of non-SOV travel. A more detailed discussion of the data elements of this measure is available in the next section. The FHWA will revisit the measures related to multimodal travel following the completion of its research study in the Fall of 2018.

After reviewing these comments, FHWA has decided to include a new multimodal measure, the portion of non-SOV travel, as a CMAQ Traffic Congestion measure. The FHWA believes non-vehicular modes play an important role in reducing levels of criteria pollutants in urbanized areas, and because transportation in urbanized areas is inherently multimodal, it is important to account as much as possible for the options that are available to travelers in those urbanized areas. This measure will help carry out the CMAQ program, as the program recognizes investments that increase multimodal solutions and vehicle occupancy levels as strategies to reduce both criteria pollutant emissions and congestion. The measure adopted in this rule is the percent of non-SOV travel. The measure includes modes that are included in the ACS Journey to Work data, which generally includes all modes that are not SOV and include travel avoided by teleworking.

Based on the comments, FHWA provides three options for State DOTs and MPOs to calculate modal share. The first option is use of the American Community Survey Journey to Work mode share data (updated annually to every 3 years depending on size of urbanized area). These data are nationally consistent, but have limitations in creating a comprehensive picture of multimodal travel. The second option is for State DOTs and MPOs to use locally specific surveys, which may be more accurate than the ACS. The third option is for State DOTs and MPOs to use volume counts for each mode to determine the percent non-SOV travel. While use of the second or third options may result in reporting that is not nationally consistent, FHWA believes that any of these data sources (national or local) can be used to create a meaningful non-SOV mode share measure. Including these options also encourages States and MPOs to develop and use the local measurement methods to help build a more accurate national picture of mode use in the United States.

Non-SOV travel may include travel via carpool, van, public transportation, commuter rail, walking, or bicycling, as well as telecommuting.

The applicability of the CMAQ Modal Share measure is the same as for the CMAQ Peak Hour Excessive Delay measure. The FHWA decided to use the same geographic applicability because FHWA views these two CMAQ Traffic Congestion measures as complimentary, yet different, as both yield important information useful to understanding traffic congestion and the methods available to address it.

#### 3. Data for Multimodal Measure

The Oregon and Washington State DOTs suggested that FHWA use the American Community Survey (ACS) for transit or multimodal-related data. Other commenters suggested using ACS data to gain a baseline of regional average vehicle occupancy and then coupling that with technology-based methods to measure AVO and per-person throughput along roadways. The Oregon Metro Council and the Joint Policy Advisory Committee on Transportation suggested adding journey-to-work mode share data from the ACS as a measure under subpart G to complement the annual per-capita VMT measure. The T4A suggested that FHWA should work with the U.S. Census Bureau to improve the ACS so that it reflects trip purpose and multimodal trips, which work could in turn inform improvements to the NHTS.

Some commenters explained that they do not have robust, reliable data for surface modes other than highways, transit, commuter rail, and passenger rail. In Maryland, for example, these data are available only in the urbanized areas affected by the congestion performance measures. The Delaware Valley Regional Planning Commission stated that FHWA should improve the hourly volume estimation as proposed for the excessive delay measure calculation, because accounting for volumes would be very helpful for project prioritization and would also set the stage for bringing in transit passenger volumes and eventually bicyclist and pedestrian volumes. The Florida DOT described its approach for analysis of volumes from continuous traffic count stations. The New York State DOT cited the challenges of developing hourly traffic volume data for use in the proposed performance measures and noted that their State's program is on a 3-year cycle (as required by HPMS) and not the 2-year cycle described in this rulemaking. The FHWA agrees with the many commenters that suggested using the

ACS data to measure modal share because the data are readily accessible to all potential users and is nationally consistent. The FHWA adopted this approach because it agrees that some State DOTs and MPOs do have the capability today to count different modes of travel. The FHWA also recognizes the limitations of using a survey-based data set and has provided additional options for State DOTs and MPOs to calculate this measure. State DOTs and MPOs are not required to use mode counts, nor are they required to submit them to FHWA. The FHWA acknowledges the importance of a nationally consistent data to compare urbanized areas, but also recognizes that mode count data is an area of ongoing development and could help spur the development of improved measures in the future. The FHWA also believes that increasing the quality and quantity of non-vehicular mode observations is useful in developing a complete perspective on the entire transportation system. As a result, State DOTs and MPOs have the option of using survey-based or count data to calculate this measure. For State DOTs and MPOs that choose to use count data, FHWA encourages but does not require that these data are voluntarily submitted to FHWA via national sources or databases (such as TMAS, NTD, and/or GTFS-RT).

#### 4. Applicability of the CMAQ Traffic Congestion Measures

In the NRPM, FHWA requested comments on whether the CMAQ Traffic Congestion measure should apply to smaller urbanized areas, including those with populations over 200,000. In response, most commenters—including AASHTO, 9 State DOTs, National Association of Regional Councils (NARC), NYSAMPO, and the Association of General Contractors—supported applying the CMAQ Traffic Congestion measures to urbanized areas in nonattainment or maintenance areas with a population of more than 1 million. Some commenters in support of a population threshold of 1 million argued this is consistent with congressional intent to require only those MPOs serving areas with more than 1 million people to prepare a CMAQ performance plan (see 49 U.S.C. 149(l)). They also argue it would limit the burden of compliance to those areas most likely to experience congestion.

Two commenters supported population thresholds below 1 million. The T4A supported a population threshold of 200,000, noting that 23 U.S.C. 149(l) requires a performance plan for mega-regions with more than 1

million people, but does not supersede 23 U.S.C. 150(c). The commenter added that title 23 makes a distinction between areas above and below a population of 200,000, which could be applied to this measure. The Natural Resources Defense Council stated that the restriction on congestion measurement to areas with a population over 1 million is arbitrary and unwarranted and should be removed.

The NARC and NYSAMPO also expressed concern about the applicability of urbanized area as the appropriate geography. The NYSAMPO further expressed concern about the relationship of this requirement to the separate NPRM on MPO Coordination.

The final rule revised the applicability of the CMAQ Traffic Congestion measures to urbanized areas in nonattainment or maintenance areas with a population of more than one million, before expanding to areas with a population over 200,000 for the second and all subsequent performance periods. First, FHWA believes there is public benefit to expanding over time the applicability of the CMAQ measures to additional cities and will help to contribute to achieving the national goal of congestion reduction. The FHWA believes Congress's special emphasis on MPOs located in transportation management areas, which are urbanized areas with over 200,000 in population, is informative in this regard. Congress determined these areas need to address congestion issues, and, under 23 U.S.C. 134(k) Congress has required these MPOs to address congestion management through a process that provides for effective management and operation of new and existing transportation facilities, including development of congestion management plans. The FHWA expects that expanding the applicability of these measures will lead to better planning and operational decisionmaking, especially with respect to congestion management. Applying these measures to this broader group of urbanized areas will contribute valuable information to the congestion management process under 23 U.S.C. 134(k)(3)(A) and is consistent with the DOT Beyond Traffic initiative to address congestion, including in metropolitan areas.

Expanding the applicability of these measures in subsequent performance periods to urbanized areas of 200,000 people or more will yield a larger pool of potential benefits from evaluations of mode share and reductions in peak hour excessive delay as States MPOs and Cities respond to the CMAQ performance measures. Additionally, sharing best practices among a larger

pool of urbanized areas may lead to innovative strategies to reduce peak hour excessive delay and to estimate or count transportation trips on all modes. As part of the Modal Share measure, State DOTs and MPOs are encouraged to report data not currently available in national sources (e.g., pedestrian or bike counts) to FHWA, and expanding the applicability of these measures will improve the quality and quantity of these data nationwide.

Recognizing that these smaller urbanized areas may need more time to implement this requirement because many may not have the same level of experience or resources to consider these issues as do larger urbanized areas, FHWA decided to provide these smaller urbanized areas more time to implement the measure. The phase-in period will give smaller MPOs time to understand the measure, what is necessary to calculate the measure, and how setting targets will work. The phase-in period will reduce the overall burden for State/MPO coordination with respect to target setting for both of the CMAQ Traffic Congestion measures. The PHED measure has also been simplified to require less coordination and less data (i.e., only requiring data during peak hours) than the proposed excessive delay measure in the NPRM. Although the Modal Share measure is new, one option uses widely available ACS data and is simple to calculate.

The FHWA believes that urbanized areas should be the boundary used to define applicable areas, as these areas are used in practice today to define the minimum planning scope of metropolitan areas. The FHWA acknowledges the comment regarding deferring a decision on the area of applicability of these measures until completion of the NPRM on MPO Coordination and Planning Area Reform. The FHWA declines to defer the decision in this rule. This rule provides sufficient lead time to accommodate any coordination or decisionmaking requirements regarding the applicability of the CMAQ PHED measure that may arise out of a final MPO rule.

#### *F. Subpart H—National Performance Measure for the CMAQ Program—On Road Mobile Source Emissions*

##### 1. General Comments

Several commenters expressed support for the proposed on-road mobile source emissions performance measure. Other commenters expressed support for FHWA's overall approach of using emission reductions by pollutant for the performance measure for on-road

mobile source emissions. One commenter argued that the nation's transportation system is responsible for roughly 23 percent of the country's emissions and any regulations that require State DOTs to monitor emissions released by automobiles will help reduce emissions drastically, and another recommended that FHWA develop a measure of emissions per person trip for non-freeway NHS roads. Several commenters urged FHWA to incorporate GHG emissions reduction reporting into the on-road mobile source emissions performance measure.

After careful consideration of these comments, FHWA retained the CMAQ on-road mobile source emissions measure, with some modifications as explained in response to specific comments. The FHWA decided after reviewing all the comments regarding a GHG measure to apply it to performance of the NHS in all States and MPOs under NHPP.

##### 2. Concerns About MPO Targets and Reporting

Because the proposed on-road mobile source emissions measure did not include a provision for State DOTs to approve MPO emission reduction targets, the Kentucky Transportation Cabinet expressed concern that the rule would allow an MPO to attempt to force a disproportionate amount of CMAQ funds to be awarded to its area by setting an overly aggressive target and recommended that targets for the on-road mobile source emissions measure should only be required for State DOTs and not MPOs, with a provision for State DOTs to concur with MPO targets. The Oregon DOT suggested that States have flexibility in determining the appropriate target setting entity, whether it is a State DOT or the MPOs.

The FHWA believes that State DOTs and MPOs have the authority to establish their targets at their discretion. Moreover, MAP-21 does not provide FHWA the authority to approve or reject State DOT or MPO established targets. No changes were made in response to these comments.

##### 3. Applicability

Several commenters, including AASHTO and several State DOTs, recommended that FHWA revise the proposed on-road mobile source emissions performance measure so that it only applies to urban areas with populations of over 1 million. The AASHTO expressed concern that smaller urban areas may not have the capacity (resources and staffing) to address the on-road mobile source emissions measure. Further, AASHTO,

Connecticut DOT, and Washington DOT commented that limiting the on-road mobile source emissions measure to urban areas with over 1 million populations would be consistent with congressional intent, because the requirement to prepare a CMAQ performance plan is limited by statute to MPOs serving areas of over 1 million in population. The Washington State DOT and Oregon DOT also reasoned that because smaller urban areas do not receive large amounts of CMAQ funding, those MPOs may use multiple years' allocations to fund a single project, which would result in such MPOs having no reportable benefits for certain years and give a false impression that an MPO failed to meet a target. Further, these commenters expressed concern that setting realistic targets may prove challenging for smaller MPOs that have a limited sample size of past projects. The North Central Texas Council of Governments and several State DOTs recommended that reporting areas be consistent between CMAQ congestion and on-road mobile source emissions performance measures in order to make reporting simpler. Specifically, the State DOTs recommended that the on-road mobile source emissions measure be modified so that it would apply to the same areas as the CMAQ congestion measure in the NPRM, only in urbanized areas with a population of over one million in nonattainment or maintenance areas for criteria pollutants under the CMAQ program. The commenters argued that this approach would allow for consistency with Congress's decision to limit the requirement for the preparation of a CMAQ performance plan to areas of over one million in population.

In contrast, Oregon Metro Council and the Joint Policy Advisory Committee on Transportation urged FHWA to apply the on-road mobile source emissions performance measure to all CMAQ program recipients, regardless of size of population.

Several State DOTs and AASHTO argued that tying emissions reduction to expenditures for apportionments for the entire CMAQ program will result in a negative effect on a State's statutorily given right to utilize flexible funding, which would contradict the purpose of the flexibility provision of 23 U.S.C. 149. As a result, they stated that 490.803 should apply only to non-flexible CMAQ funds. The AASHTO, Connecticut DOT, and Montana DOT urged FHWA not to require emissions data reporting as to flexible CMAQ funds, because requiring such reporting could indirectly pressure States to



forego the flexibility provided by Congress. The Mississippi DOT urged FHWA to make concessions for rural areas and reduce or eliminate CMAQ reporting requirements for non-urban areas, and Oregon DOT asked that rural areas be exempt from the on-road mobile source emissions measure as the major contributors to the pollutions in such areas tend to be from road dust and topographical effects.

Since all ozone, carbon monoxide, or particulate matter nonattainment and maintenance areas, regardless of size, are eligible to receive CMAQ funds and all CMAQ funded projects must demonstrate an emissions reduction, FHWA has concluded that the emissions measure should apply to all such areas regardless of population. In contrast to the CMAQ PHED and Modal Share measures, the emissions measure does not raise significant challenges to achieve a fair balance between the benefits of the measure and the burden of applying it. The burden for reporting on this measure is easier than for the CMAQ traffic congestion measures, since the emissions measure data come from an existing database used since 1992. The FHWA has not made any changes in the final rule based on these comments.

Additionally, States with rural areas designated nonattainment or maintenance may obligate CMAQ funds in those areas. Therefore, they should also be subject to this measure. The FHWA has not made any changes in the final rule based on this comment. Finally, FHWA agrees that Congress provided the areas with flexible funds the ability to use those CMAQ dollars on CMAQ or Surface Transportation Block Grant (STBG) eligible projects. The FHWA does not agree, however, that this measure should be limited only to mandatory CMAQ projects. There is enough flexibility in how a State DOT or MPO establishes its target that it can account for any flexible funds it plans to spend on STBG eligible projects at that time. Therefore, FHWA has not made any changes in the final rule based on this comment.

#### 4. Applicability of New Standards

One commenter encouraged FHWA to acknowledge the importance of good air quality in borderline nonattainment areas in the air quality performance measure, and another expressed concern that as the NAAQS become more stringent over time, the workload for State DOTs and MPOs to comply with the performance measure will increase because more nonattainment areas will be designated. Others suggested the rule build in a later deadline for such cases

and provide specific authority for a waiver to be granted to affected States and MPOs in terms of deadlines—when an area is newly designated as nonattainment, so that it can have more time in setting targets relevant to the affected area. Alternatively, GDOT recommended that nonattainment and maintenance designation for the baseline performance period be as of October 1, 2017 (one year in advance of first baseline report). The GDOT noted that given significant uncertainty over designation and revocation timeframes experienced over many years, this baseline would provide some assurances and, hopefully, avoid unnecessary resource expenditure based on assumed designations before October 2018.

The FHWA does not agree that special consideration or a waiver is needed for newly designated nonattainment areas. Potential areas have sufficient notice that they may be designated nonattainment. Therefore, States do not need more time to meet the performance measure requirements than afforded the other areas to establish targets. In addition, FHWA has clarified in the final rule that the baseline nonattainment and maintenance area designations should be based on area status as of October 1, 2017.

#### 5. Reporting

Several commenters requested clarity on the timeframe for reporting emissions reductions. Several commenters suggested that emission reduction benefits for CMAQ-funded projects should be reported after the project has been completed and is open for use, rather than the first time CMAQ funding is obligated for the project. Others argued that the proposed on-road mobile source emissions measure reporting timing would be disadvantageous for smaller urban areas, because such MPOs sometimes use multiple years' allocations to fund a single project, which could give the false impression that an MPO failed to meet a target if there were no reportable emissions reductions for certain years. These commenters also asked FHWA to clarify the year to which the first March 1 and July 1 due dates apply.

Some commenters suggested that limiting emissions reductions benefits to a single year would understate the actual benefits realized because the life of the benefits last as long as the project, which can be from 1 year (e.g., operations) to decades (e.g., built facilities, locomotive repower projects). For this reason, they recommended that FHWA add two fields to the CMAQ Public Access System—one for year

open to service (or completion year) and one for expected service life, which would allow the benefits for a given project to count beginning in the year open to service and continue to be counted as long as the service life has not been exceeded. They said this approach would avoid the complication that would result from the use of advance construction to initiate projects if the rule relied on the first year of obligation as the emissions reduction benefits trigger. The commenters also suggested that FHWA consider a moving average for emissions reductions to smooth out the uneven implementation of projects, arguing that in some years a target would be exceeded while no benefits may be realized in other years. The Association of Metropolitan Planning Organizations and Fairbanks Metropolitan Area Transport System suggested that it may be better to report benefits on a project specific basis.

The California Association of Councils of Government et al. requested guidance regarding how States and MPOs should reconcile variations in emissions model outputs over time solely due to emissions model updates. Regarding the first performance report, AASHTO and Connecticut DOT asked if the emission reduction assigned at the time the project was entered would be the target value or if the projects need to be recalculated using current emissions modeling, emission factors, etc. to determine whether the target was met.

To keep this measure simple and consistent with the current CMAQ reporting requirements, a project's estimated emissions reductions are only for the first year of full operation. The information is entered in the CMAQ Public Access system only for the first year the project has funds obligated to avoid double counting benefits. The FHWA understands this approach may result in taking credit for a project in a performance period before it becomes operational, but believes the simplicity of this process is appropriate. The March 1 deadline for State DOTs to enter their CMAQ project information in the CMAQ Public Access System is not a new deadline. The CMAQ Program Guidance includes this same date for entering project information for the previous fiscal year. Therefore, this date applies now and will continue to apply with this final rule. The July 1 date is a new deadline for FHWA to ensure all information is in the CMAQ Public Access System. This due date will apply on July 1 after this final rule is effective.

The FHWA clarifies that there is no requirement to recalculate the emissions entered into the CMAQ Public Access

System or to make adjustments to emissions estimates previously entered into the Public Access System when U.S. EPA approves new models. States or MPOs that believe they would not be able to meet a target due to a change in the models can adjust the target at the performance period's mid-point or explain in their final performance report why they were unable to meet their targets due to model-based emissions estimate. The FHWA has not made any changes in the final rule based on these comments.

#### 6. Concerns Related to Quantification of Emissions

Some commenters expressed concerns relating to quantifying emissions for certain projects such as fiber installation and traffic monitoring. Another commenter stated that transit projects may not demonstrate as much emissions reduction as heavy-duty engine replacement projects, even though additional transit service may be necessary to address regional and corridor congestion.

Several commenters asked that FHWA continue to give State DOTs discretion to determine if quantitative CMAQ reporting is required, or expressed support for not being required to quantify emissions benefits in every situation, or argued in favor of States having the ability to update information in the CMAQ database. However, several others commented that they do not want to have to update their emissions because it would not be a good use of resources.

The Oregon DOT and Washington State DOT disagreed with requiring CMAQ projects that fund operations improvements or are aimed at increasing person throughput to show a reduction in emissions, reasoning that latent demand often replaces any capacity made available by operational improvements. The Georgia DOT requested that FHWA provide guidance for establishing targets, because targets could be different by project types and limit/extent, and asked if the single target would reflect the total emission reductions of all projects in the nonattainment area during the 2- and/or 4-year timeframe. Expressing concern that 2- and 4-year targets will be difficult to set based on current information in the CMAQ Public Access System, Oregon DOT recommended that FHWA carry out additional research to determine how to successfully implement the on-road mobile source emissions measure.

Under the CMAQ program, State DOTs and MPOs have the discretion to fund projects where it is not possible or

easy to quantify the emissions benefit. However, these projects will not be accounted for in this performance measure since by the nature of the project, it is not possible to quantify the emissions benefit. Further, FHWA appreciates the concerns raised with respect to lifecycle benefits, but in order to keep the CMAQ reporting system simple and easy to use, it does not require the calculation of life cycle emissions benefits.

States and MPOs must use projects in the 4 years prior to the first performance year as a basis for establishing a target for the first performance period. The projects entered into the System during the 2- and 4-year performance period will be taken as is to calculate the measure. If a State or MPO felt they would not be able to meet a target, they could adjust the target at the mid-point of the performance period or explain in their final performance report why they were unable to meet their targets. The FHWA has not made any changes in the final rule based on these comments.

#### 7. Application Beyond CMAQ Projects

The majority of commenters on this topic expressed concern over limiting the on-road mobile source emissions measure to only those projects that receive CMAQ funding. One argued it would be inefficient, another that emissions reductions from all recipients of CMAQ dollars should be assessed, and another that the best opportunity to reduce emissions comes from operations and capital projects. The Nashville Area MPO and T4A recommended that total emissions reductions be measured for areas designated as nonattainment or maintenance for ozone, carbon monoxide, or particulate matter and that targets under this measure should be set to consider all capital and operational opportunities to reduce emissions, not just those that receive CMAQ funding. Another noted that projects tend to have multiple funding sources. Other commenters recommended that the targets under the on-road mobile source emissions performance measure consider all transportation projects and not just CMAQ-funded projects, or that as emission reductions become more easily estimated, the measure could be expanded to all projects. One commenter encouraged FHWA to focus on successful actions States are taking rather than from where funding is coming. Another recommended that emission reductions should be assessed at the State or region scale.

In contrast, AASHTO and others expressed support for the proposal that the on-road mobile source emissions performance measure not apply to

States and MPOs that do not contain any portions of a nonattainment area. The Virginia DOT further recommended that FHWA consider a region-wide air quality measure, as CMAQ projects are generally a small subset of transportation projects. The AASHTO, Connecticut DOT, and Montana DOT urged FHWA not to require emissions data reporting as to flexible CMAQ funds, because requiring such reporting could indirectly pressure States to forego the flexibility provided by Congress.

The FHWA does not agree this measure should extend beyond the CMAQ program since the performance measure, as defined in 23 U.S.C. 150(c)(5), is specifically tied to the CMAQ program. The FHWA also does not agree that the measure should apply to all States or regions that receive CMAQ funds or that the emissions benefits included should extend beyond the CMAQ program. As noted in the NPRM, attainment areas are allowed flexibility in spending their CMAQ funds whereby projects are not required to adhere to specific CMAQ eligibility requirements. While there are many projects funded with monies beyond the CMAQ program that result in an emissions benefit, the performance measure, as defined in 23 U.S.C. 150(c)(5), is specifically tied to CMAQ program. The purpose of the CMAQ program is to fund transportation projects or programs that contribute to the attainment or maintenances of the NAAQS in nonattainment or maintenance areas. The FHWA has not made any changes in the final rule based on these comments.

#### 8. Attainment Definition—Removal of Areas Beyond 20-Year Maintenance Plan

Oregon DOT suggested that an area should be considered attainment if it has reached the end of its 20-year maintenance plan.

The FHWA agrees that when an area reaches the end of its 20-year maintenance plan for an applicable pollutant, the CMAQ performance reporting requirement should no longer apply. Changes were made to the definition of "maintenance area" in section 490.101 and to the data requirements in section 490.809(c).

#### 9. Modification of Emissions Information at 2-Year Report

The Connecticut DOT recommended that FHWA allow revisions to the applicability of the on-road mobile source emissions performance measure to certain criteria pollutants if the NAAQS designation status changes

during the 4-year performance period, especially at the 2-year midpoint.

The Oregon Metro Council and the Joint Policy Advisory Committee on Transportation expressed concern that the proposed rule was unclear about how to address delay and cancellation of projects funded by CMAQ in the emissions reduction reporting. In particular, this commenter asked about procedures for removing the emissions reductions already accounted for in previous reporting to ensure that emission reduction credit is not taken for a project that continues to get slipped and carried over from one year to the next.

The FHWA agrees that flexibility should be provided to areas if their designations change during the 4-year performance period. The FHWA has revised the language in § 490.809(c) so that nonattainment and maintenance areas will be revised if an area is no longer nonattainment or maintenance, for any pollutants in § 490.803.

#### 10. Concerns About the CMAQ Public Access System Data; Use of Observed Data and Other Alternative Methods

Some commenters expressed concerns with data deficiencies in the CMAQ Public Access System that should be corrected before reliance on its use for the on-road mobile source emissions performance measure. For example, AASHTO and Connecticut DOT commented that the inability to de-obligate an entry was a deficiency in the User Profile and Access Control System (UPACS) that needs to be corrected to meet the requirements of the on-road mobile source emissions performance measure. The AASHTO, Oregon DOT, and Connecticut DOT expressed concern that emissions reductions often are estimated differently by different MPOs and that sometimes even similar projects within an agency have vastly different estimates. The Chicago Metropolitan Agency for Planning warned that it will be difficult to ensure data quality submitted for performance reports because projects in the database have not matched up well with local project descriptions, which is in part a result of the local programmer (often the MPO) submitting data to the State, which then repackages it for submission to the Public Access System. Others commented that because the UPACS/ Public Access System is intended to track emissions reductions benefits, it is not well suited to evaluate attainment of targets. One commenter noted that adding health impact information for each pollutant would be useful to decisionmakers. Another recommended that FHWA provide a workbook to input

more environmental information into the CMAQ Public Access System (e.g., population density, traffic congestion, extreme weather events). The Pennsylvania DOT recommended that the emission reduction performance measure should be based on cost-effectiveness.

Several commenters sought clarification on various issues related to calculating emissions reductions for purposes of the proposed on-road mobile source emissions performance measure, and various alternative methods or improvements to the UPACS/CMAQ Public Access System were suggested.

The Oregon Metro Council and the Joint Policy Advisory Committee on Transportation expressed concern that the proposed on-road mobile source emissions performance measure does not meet the same standards as other performance measures because it is not based on observed data.

The Oregon DOT and Washington State DOT commented that collecting emissions data on a project-by-project basis through vehicle probing or other means would be cost-prohibitive and take years to collect enough data to use. Others recommended that FHWA create a look-up table that it would update periodically and which lists emission reductions that may be expected for a range of smaller projects. Similarly, Oregon DOT suggested that FHWA consider ways to quantify some projects that nationwide tend to have missing data.

While FHWA is aware that this measure is based on estimated emissions reduction, not measured or observed emissions, the tools to do otherwise are not available, and the time needed to measure the change in emissions from every CMAQ project would be not be practicable. State DOTs and MPOs have been strongly encouraged to quantitatively report their emission benefits for all CMAQ projects since 1992. The first modules of FHWA's tool kit of best practices are already available, and additional modules now under development will be available before the first performance period. No changes were made in response to these comments.

#### 11. Applicability of Measure to All Criteria Pollutants and Precursors

The United States Green Building Council commented that MPOS should be required to measure the criteria air pollution of their plans and subsequently work to reduce criteria pollutant levels. Another suggested that the on-road mobile source emissions performance measure should allow

States and MPOs to include emissions reductions from CMAQ projects for all criteria pollutants (and their precursors), regardless of the type of attainment/nonattainment areas in which the project is located. This commenter reasoned that it may be difficult to separate out reductions that only pertain to the specific nonattainment and maintenance areas, particularly for regional or statewide CMAQ projects.

Several commented that no other non-CMAQ pollutants should be added to the on-road mobile source emissions performance measure. Specifically, Oregon DOT recommended that FHWA limit defined pollutants and not include open ended definitions that have the potential to expand performance measure burdens under this rule due to actions by another agency. The Connecticut DOT commented that subpart H performance targets only should be set for criteria pollutants for which a State currently reports emissions reductions.

The FHWA agrees that it is not always easy to determine the emissions benefits for some projects by nonattainment or maintenance area. However, to the extent an area wants to take credit for the emissions reductions for a statewide project, they should use the best tools available to determine which portion of that project benefits their area. This problem is not new to the CMAQ program or even regional emissions analyses under transportation conformity that must account for the emissions of all projects within a nonattainment or maintenance area. Therefore, FHWA has not made any changes in the final rule based on this comment.

#### 12. Use of Standard System Versus Metric System To Measure Emissions

The AASHTO and Connecticut DOT recommended that FHWA change the protocol for the CMAQ Public Access System from the metric system (kg/day) to standard (lbs/day) for consistency to life of the project cost effectiveness. Others recommended that emission reduction benefits be compared in tons per annualized days to allow a fair comparison between projects that may have a varied number of effective days. The Association of Metropolitan Planning Organizations commented that converting the kilograms per day emissions data to tons per year does not provide any new information about the performance of the project or how it compares to other projects. Rather than having the measure be expressed in short tons per year, one commenter suggested that the measure should be



expressed in total number of short tons of pollutant removed over the 2- and 4-year periods. This commenter also recommended that the equation given in section 490.813(b) should be modified to add a parameter for the number of years or the regulation should provide an additional equation for the 4-year calculation.

The FHWA agrees with the concerns raised about the proposed metric and therefore has removed that conversion from the emissions measure calculation in section 490.813(b). This change also results in a change in the units for the emissions measure in section 490.813.

## **VI. Section-by-Section Discussion of the General Information and National Performance Management Measures; Assessing Performance of the National Highway System, Freight Movement on the Interstate System, and Congestion Mitigation and Air Quality Improvement Program**

### *A. Subpart A—General Information*

#### **Discussion Section of § 490.101 Definitions**

The FHWA made the following changes and additions to the definitions proposed in the NPRM.

**American Community Survey (ACS)**—A definition was added to describe a data source that is needed to support new required measure components. The ACS is being identified as a source of information to acquire data on travel choices to journey to work in urban areas.

**Freight bottlenecks**—The definition of “freight bottleneck” has been changed to “truck freight bottleneck” and revised to provide a general description that allows State DOTs to determine based upon individual context. The definition also does not limit the location to the Interstate. Each State will need to define what constitutes bottlenecks based upon the specific context of the State and the local impediments that each State experiences with regard to freight movement.

**Maintenance area**—FHWA has amended the definition of maintenance area to exclude areas that reach the end of their 20-year maintenance period for the purposes of part 490.

**National Performance Management Research Data Set (NPMRDS)**—the definition of the NPMRDS was revised to clarify that only mainline highway portions of the NHS are included in the data set. In addition, the definition was revised to change the interval of travel times from 5 to 15 minutes.

**Non-SOV Travel**—a definition was added for travel occurring on modes other than driving alone in a motorized

vehicle and includes travel that is avoided by telecommuting. This definition was added as the term, “non-SOV Travel,” is used within the regulatory text as an indicator of transportation mode choice.

#### **Discussion Section of § 490.103 Data Requirements**

The FHWA made the following changes regarding Data Requirements.

Throughout the final rule the timing for determination of measure applicability has been changed from “at the time when the State Baseline Performance Period Report is due” to “one year before the time when the State Baseline Performance Period Report is due.” In § 490.103(c), State DOTs must use the nonattainment and maintenance boundaries based on the most recent EPA designations at the time that is “one year before” the State Baseline Performance Report is due. As discussed in the change to the definition of “maintenance” areas, EPA designations of maintenance areas that have reached the end of their 20-year maintenance period will not be applicable to the requirements of subpart H.

The FHWA revised the equivalent data requirements under section 490.103(e)(5)(ii) to clarify that the equivalent data set only is required to include travel time data for the “mainline highways” on the NHS. In addition, § 490.103(e)(5)(ii) was revised to include travel times at a maximum of 15 minute intervals. The temporal granularity of the average travel times in the equivalent data was reduced from the proposed 5 minute interval level to 15 minutes.

In section 490.103(e)(5)(iii), for equivalent data sets, travel must be observed and may be derived from travel times over longer time periods (known as path processing or equivalent).

Text was added in § 490.103(f)(1) to clarify that it is acceptable to use the NPMRDS Travel Time Segments as the Reporting Segments by stating that it is optional to create new Reporting Segments.

The FHWA revised § 490.103(f)(2) to increase the maximum length of reporting segments in urban areas from ½ mile to 1 mile (unless an individual Travel Time segment is longer).

In § 490.103(g) of the NPRM, FHWA proposed that the State DOT would submit its reporting segments for the NHS and the desired travel times for applicable<sup>67</sup> reporting segments to

<sup>67</sup> Reporting segments on NHS located within urbanized areas with populations over 1 million for the proposed Peak Hour Travel Time measures.

HPMS no later than November 1, prior to the beginning of the calendar year in which they will be used for travel time data collection. The FHWA also proposed that these reported reporting segments would be used throughout the performance period. The FHWA felt that a 2-step data reporting (first step is reporting segments and desired travel times and second step is reporting metric data for corresponding reporting segments) along with constant reporting segments throughout the performance period is necessary to ensure consistency between data sets at the time of target establishment and subsequent progress evaluations. Since this final rule removes the proposed Peak Hour Travel Time measures in section 490.507, travel time data sets could change (NPMRDS to/from an equivalent data set) during a performance period, and removing the requirements to maintain constant NHS limits during a performance period in section 490.105(d)(3), FHWA believes the first step of data reporting unnecessary. Accordingly, FHWA removes, in the final rule, the proposed reporting requirement for reporting segments and desired travel times prior to the beginning of the calendar year in which they will be used for travel time data collection in § 490.103(g). The FHWA believes that eliminating this reporting step will reduce the burden on the State DOTs. As a result, FHWA moves the requirement for documentation of the State DOT and applicable MPOs coordination and agreement on the travel time data set in § 490.103(g)(4) in the NPRM to § 490.103(f)(4) in the final rule. The FHWA also moves the requirement for the reporting segments in an equivalent data be referenced by HPMS location referencing standards in § 490.103(g)(5) in the NPRM to § 490.103(e)(5)(i) in the final rule.

Section 490.103(g) has been revised in this final rule. In this section, State DOTs are encouraged to report the Posted Speed Limits for the full extent of the NHS via HPMS as this data is needed for State DOTs to identify the occurrence of excessive delays.

#### **Discussion Section of § 490.105 Establishment of Performance Targets**

##### **Section 490.105(d)(3) and (e)(3)(i)—Maintaining Urbanized Area Constant Throughout a Performance Period**

In section 490.105(d)(3), FHWA removes the requirement for maintaining urbanized area constant throughout a performance period. The FHWA made this change because the requirements for NHS limits constant

throughout a performance period was eliminated in the final rule for the second performance management measures. In addition to consistency between NHS limits data and urbanized area data, FHWA believes State DOTs and MPOs will have sufficient time to adopt updated U.S. Census decennial census data in their target establishment/adjustment since the NHS and urbanized area data used for travel time data collection for a calendar year will have a 2-year time lag. For example, 2015 NHS limits and urbanized area data collected is reported in 2016 to HPMS and that data will be used for travel time data collection in 2017. Additionally, HPMS allows 2 years to adopt updated decennial census urbanized area data. So, FHWA believes that there will be adequate time between U.S. Census publications of decennial census urbanized area data and target establishment and adjustment. For these reasons, FHWA revises § 490.105(d)(3) for removing the requirement for maintaining urbanized area constant throughout a performance period for the urbanized area specific targets, as provided in § 490.105(e)(8). For the same reason, the FHWA revises § 490.105(e)(3)(i) so that State DOTs no longer required to “declare” the boundaries used to establish each additional target and so that changes in urbanized area will be accounted for the additional targets, as described in § 490.105(e)(3).

**Section 490.105(e)(8)(i) and (ii) and (f)(5)(i) and (ii)—Urbanized Area Population Threshold for CMAQ Traffic Congestion Measures**

In section 490.703, FHWA revises the urbanized area population threshold for traffic congestion measures, in § 490.707(a) and (b), from 1 million to 200,000. In response to the revision in section 490.703, FHWA revises § 490.105(e)(8)(i), (e)(8)(ii), (f)(5)(i), and (f)(5)(ii). In § 490.105(e)(8)(i) and (f)(5)(i), the 1 million population threshold only applies to the first performance period (*i.e.*, the performance period beginning on January 1, 2018). In § 490.105(e)(8)(ii) and (f)(5)(ii), the 200,000 population threshold applies to the second performance period (*i.e.*, the performance period beginning on January 1, 2022) and all subsequent performance periods thereafter.

**Sections 490.105(e)(8)(iii), (f)(5)(iii), and (f)(6)(iii), and 490.107(c)(3)—Population Data Sources for CMAQ Measure Applicability Determination**

Total population of an urbanized area in section 490.713(b) in the final rule is

revised from the Decennial Census population number to the most recent annual population estimate from the U.S. Census Bureau. Section 490.105(e)(8)(iii)(D) and (f)(5)(iii)(D) have been revised so that the data source for applicability determination and the measure computation are the same.

To maintain consistency with the population data source for determining the applicability of the CMAQ traffic congestion measures, FHWA revises sections 490.105(f)(6)(iii) and 490.107(c)(3) to use the most recent annual population estimates from the U.S. Census Bureau in determining which MPOs are required to submit MPO CMAQ Performance Plan.

**Section 490.105(e)(8) & (9) and (f)(5) & (6)—CMAQ Measure Applicability Determination Timing and Methodology**

In paragraphs (e)(8)(iii)(D) through (F), (e)(8)(iv), (f)(5)(iii)(D) through (F) and (f)(5)(iv), FHWA revises the timing of determining which State DOTs and MPOs are required to implement traffic congestion measures in § 490.707(a) and (b). The applicability determination for traffic congestion measures will be made 1 year before when the State DOT Baseline Performance Period Report.

In paragraphs (e)(9)(v) and (f)(5)(v), FHWA revises the timing of determining which State DOTs and MPOs are required to implement on-road mobile source emissions measure in § 490.807. The applicability determination for on-road mobile source emissions measure will be made 1 year before when the State DOT Baseline Performance Period Report.

In paragraphs (e)(8)(iii)(F), (e)(8)(v), (f)(5)(iii)(F), and (f)(5)(v) of this section, FHWA revises the requirements for the determination of nonattainment and maintenance areas to revisit the designations one year before the State DOT Mid Performance Period Progress Report is due to FHWA. Any urbanized areas that are determined at this point to be no longer in nonattainment or maintenance for a criteria pollutant included in section 490.703 will not be subject to the traffic congestion measure requirements for the remainder of the performance period.

In paragraphs (e)(9)(v), (e)(9)(viii), and (f)(6)(v) of this section, FHWA revises the requirements for the determination of nonattainment and maintenance areas to revisit the designations one year before the State DOT Mid Performance Period Progress Report is due to FHWA. Any area within State boundary or metropolitan planning area that are determined at this point to be no longer in nonattainment or maintenance for

any criteria pollutant included in section 490.803 will not be subject to the on-road mobile source emission measure requirements for the remainder of the performance period.

In paragraphs (e)(8)(vi) and (f)(5)(vi) of this section, FHWA revises the phase-in for the establishment of urbanized area specific targets. The phase-in does not require State DOTs and MPOs to establish a 2-year target for the first performance period to provide time to build capacity and to acquire sufficient to calculate the new PHED measure in § 490.707(a). The phase-in of urbanized area specific targets does not apply to the new non-SOV travel measure in § 490.707(b).

**Discussion Section of § 490.107 Reporting on Performance Targets**

**Section 490.107(a)(4)—Initial State Performance Report**

Section 490.107(a)(4) and (5) have been removed in this final rule.

**Section 490.107(b)(1)(ii)(E)—NHS Limits for Targets**

The NHS limits for targets are removed from section 490.107(b)(1)(ii)(E) and State are not required to include them in the State Baseline Performance Period Report. This requirement was removed as NHS limits will not be held constant for the duration of the performance period in the assessment of progress made by State DOTs to achieve targets. As discussed in the Pavement and Bridge Condition Performance Measure final rule, commenters felt that changes in NHS limits that may occur from year to year can be reasonably considered in the establishment of targets.

**Section 490.107(b)(1)(ii)(E), (b)(2)(ii)(D), and (b)(3)(ii)(D)—Reporting Congestion at Truck Freight Bottlenecks**

Section 490.107(b)(1)(ii)(E), (b)(2)(ii)(D), and (b)(3)(ii)(D) have been revised to clarify that States must document the location of freight bottlenecks with the State including those identified in the National Strategic Freight Plan. The section also sets forth the conditions under which a State Freight Plan may serve as the basis for identifying truck freight bottlenecks.

**Section 490.107(b)(1), (2) and (3)—Reporting Metrics for GHG Measure**

As discussed in the discussion section for § 490.511, State DOTs are required to report total annual on-road CO<sub>2</sub> emissions on the NHS and total annual on-road CO<sub>2</sub> emissions, for the measure specified in § 490.507(b), to FHWA as part of the State Biennial Performance Report. Accordingly, FHWA adds



§ 490.107(b)(1)(ii)(H), (b)(2)(ii)(J), and (b)(3)(ii)(I) in the final rule.

**Section 490.107(b)(1)—Reporting Data Collection Method for the Percent Non-SOV Travel Measure**

As discussed in discussion section for § 490.709, State DOTs are required to report in their Baseline Performance Period Report the data collection method that is used to determine the Percent non-SOV Travel measure, in section 490.707(b), for each applicable urbanized area in the State, as provided in section 490.709(f)(2). Accordingly, FHWA adds § 490.107(b)(1)(ii)(I) in the final rule.

**Section 490.107(c)(3)—MPO CMAQ Performance Plan Applicability Determination Timing**

In § 490.107(c)(3), FHWA revises the timing of determining which MPOs are required to develop and report CMAQ Performance Plan. The applicability determination for the MPO CMAQ Performance Plan will be made 1 year before when the State DOT Baseline Performance Period Report. Also, FHWA revises § 490.107(c)(3) so that nonattainment and maintenance areas to revisit the designations one year before the State DOT Mid Performance Period Progress Report is due to FHWA. Any area within metropolitan planning area, within an urbanized area with a population greater than 1 million, that are determined at this point to be no longer in nonattainment or maintenance for any criteria pollutant included in section 490.803 will not be subject to the MPO CMAQ Performance Plan for the remainder of that performance period.

**B. Subpart E—National Performance Management Measures for the NHPP System Performance**

**Discussion Section 490.503 Applicability**

The FHWA removed the applicability language relating to Peak Hour Travel Time measures because those measures have been removed from the rule. The FHWA added a provision for the GHG measure in § 490.507(b), making it applicable to all mainline highways on the Interstate and non-Interstate NHS.

**Discussion Section of § 490.505 Definitions**

The following changes were made to the definitions in section 490.505 to address comments received.

A definition has been established to define Greenhouse Gas as any gas that

absorbs infrared radiation in the atmosphere. The definition further notes that ninety-five percent of transportation GHG emissions are carbon dioxide (CO<sub>2</sub>) from burning fossil fuel. Other transportation GHG emissions are methane (CH<sub>4</sub>), nitrous oxide (N<sub>2</sub>O), and hydrofluorocarbons (HFCs). The definition also establishes the acronym, “GHG,” that is used throughout the section to refer to Greenhouse Gas. This definition has been added as a GHG measure is established in this section to assess system performance.

The proposed definitions for Desired Peak Hour Travel Time, Peak Hour Travel Time, The Peak Period, and Peak Hour Travel Time Ratio were all removed from section as the measure of the percentage of the system meeting peak hour travel time expectations has been removed.

**Discussion Section of § 490.507 National Performance Management Measures for System Performance**

The NHPP Reliability measure has been changed from, “Percent of the Interstate System providing for Reliable Travel Times,” to “Percent of person-miles travelled on the Interstate System that are reliable.” This same change has been made for the non-Interstate NHS reliability measure. The proposed Peak Hour Travel Time measures were removed in the final rule.

The FHWA added a GHG emissions performance measure in this section. The FHWA established the measure in a manner that utilizes existing data sources and minimizes burden on transportation agencies.

The GHG emissions performance metric is on-road CO<sub>2</sub> emissions from vehicles operating on the NHS. The measure will be expressed as a percent change in CO<sub>2</sub> from a reference year of 2017 levels in order to provide more meaning and context to decisionmakers and the public than a measure using a certain number of metric tons of CO<sub>2</sub>.

**Discussion Section of § 490.509 Data Requirements**

**Section 490.509(a) Through (e)—Data Requirement for the Reliability Measures**

The FHWA removed the proposed requirement to replace missing travel times with travel time at posted speed limit for the NHPP Reliability measures and all other travel time derived measures in part 490. After further analysis of data and consideration of

comments received, it was determined that, in cases where a considerable portion of the data was missing, the addition of the imputed travel times inaccurately skewed the measure results. In addition, FHWA believes that the occurrence of missing data will be reduced due to the greater prevalence of probes in the future, the allowance of path processing techniques to identify travel times, and the decreased temporal granularity of the measurements from 5 minutes to 15 minutes.

In addition, FHWA has added paragraph (e) in this section to allow State DOTs to exclude any travel times that may have been collected while the roadway was closed.

The FHWA added requirements to identify the data sources for both average annual daily traffic (AADT) volumes and average occupancy factors to support the data needs to adjust the NHPP Reliability measures to reflect person-miles of travel on the NHS. The HPMS has been identified as the data source for segment AADT, which is used to represent a full year of traffic volume by multiplying the average daily value by 365. Average occupancy factors will be determined and published by FHWA on its Web site from national surveys focused on household travel. The FHWA anticipates using the National Household Travel Survey (NHTS) to develop these factors for every State and large metropolitan areas. State DOTs, MPOs, and FHWA will be able to use the combination of total annual traffic volume, average occupancy factors, and length of reporting segment to weight the associated impact of reliability performance on all people traveling on the roadway annually.

**Section 490.509(f) Through (h)—Data Requirements for the GHG Measure**

The data requirements for calculating the CO<sub>2</sub> emissions performance measure are: (1) Emissions factors of CO<sub>2</sub> per gallon of motor fuel, (2) annual motor fuel sales volumes, and (3) vehicle miles of travel on the NHS and on all roads. Data sources for each are readily available.

The FHWA will post the applicable emissions factors annually by August 15 for use in calculating the performance measure for a range of fuels, based on U.S. Energy Information Agency (EIA) data.<sup>68</sup> Examples of emissions factors are listed below for informational purposes:

<sup>68</sup> U.S. Energy Information Agency, and <http://www.eia.gov/tools/faqs/faq.cfm?id=307&t=11>.



Fuel	Pounds CO <sub>2</sub>	Kilograms CO <sub>2</sub>
E10 (Gasoline with 10% ethanol) .....	18.95/gallon .....	8.59/gallon.
Gasoline .....	19.60/gallon .....	8.89/gallon.
Diesel .....	22.40/gallon .....	10.16/gallon.
Compressed Natural Gas (CNG) .....	54.60/McF (McF = 1,000 Cubic Feet) .....	24.76/McF (McF = 1,000 Cubic Feet).

State DOTs already collect information on fuel sales for motor vehicle fuels and report it to FHWA. In order to provide maximum flexibility and promote ease of use, State DOTs may use either of the following sources for annual motor fuel sales information:

1. Annual fuel sales volumes as posted August 15 for the previous year in FHWA's *Highway Statistics* in Table MF-21 "Motor Fuel Use."<sup>69</sup> Fuel sales are provided as a total number of gallons for combined gasoline/gasohol (gasoline ethanol blends such as E10), and special fuels (diesel, biodiesel, natural gas, etc.) combined. According to EIA, 95 percent of current gasoline sales are of E10 (ten percent blend of ethanol with gasoline).<sup>70</sup>
2. The State DOT's fuel sales data the State DOT used to create the summary data included in FHWA's MF-21, if it allows for a great level of detail by fuel type. The FHWA encourages States to track sales at a more granular level and to use the appropriate emissions factor posted by FHWA for each sub-fuel. State DOTs shall make this data available to FHWA, upon request.

Vehicle miles of travel on the NHS and on all roads by State are published in FHWA's *Highway Statistics* in Table VM-3 "Vehicle Miles of Travel, by Federal-Aid Highways." For consistency, the measure uses the most recent published annual data as of August 15 of the year in which the metric is being calculated. For example, State DOTs will access the most recent data on August 15, 2018, to calculate the annual CO<sub>2</sub> emissions on the NHS in 2017.

#### Discussion Section of § 490.511 Calculation of System Performance Metrics

##### Section 490.511(b) and (e)—Metric for Reliability Measures

The FHWA changed the basic time period for the travel time reliability measure from 5 minutes to 15 minutes. The FHWA also clarified that reporting segment-level reliability metrics and related data can be reported by either

NPMRDS TMC segment(s) or HPMS sections.

The FHWA added information to be reported to HPMS along with the metric-related information, including directional AADT (the AADT in the direction of travel for the reporting segment) and a vehicle occupancy factor if not using the FHWA-supplied factor.

##### Sections 490.511(c), (d), and (f)—Metric for the GHG Measure

State DOTs are required to calculate annual total tailpipe CO<sub>2</sub> emissions on the NHS as the metric for the GHG measure. To calculate the CO<sub>2</sub> emissions performance metric, State DOTs will use a methodology that relies on fuel sales volumes.

In order to calculate total annual on-road CO<sub>2</sub> emissions, the total volume of each fuel sold is multiplied by the appropriate CO<sub>2</sub> emission factors. The total CO<sub>2</sub> emissions for each fuel type are then summed. The CO<sub>2</sub> emissions measure is specific to the performance of the NHS. Therefore, it is necessary to estimate the portion of on-road CO<sub>2</sub> emissions attributable to the NHS by State.<sup>71</sup> Existing data does not differentiate the exact volumes of fuel burned on the NHS versus the volume of fuels burned on other roads. Therefore, States will use the proportion of the State's VMT that occurs on the NHS as a proxy for the proportion of the State's on-road CO<sub>2</sub> emissions on the NHS.<sup>72</sup> State DOTs calculate on-road CO<sub>2</sub> emissions on the NHS by multiplying on-road CO<sub>2</sub> emissions by the proportion of NHS VMT out of total VMT.

As fuel sales volumes are not generally available at the metropolitan area level, State DOTs and MPOs have flexibility on how they calculate on-road CO<sub>2</sub> emissions for MPOs. Options range from simply using the MPO share of the State's VMT as a proxy for the MPO share of CO<sub>2</sub> emissions, to more

detailed analytical methods, such as using travel demand modeling and EPA's MOVES model,<sup>73</sup> or using FHWA's EERPAT model. These methods are discussed in detail under Section V. An MPO also may use another methodology if the methodology is demonstrably valid and useful for CO<sub>2</sub> measurement. The use of a methodology not described in the rule does not require FHWA approval, but is subject to oversight.

State DOTs will report total annual on-road CO<sub>2</sub> emissions on the NHS (the GHG metric) and total annual on-road CO<sub>2</sub> emissions (the step in the calculation prior to computing the GHG metric) to FHWA as part of the State Biennial Performance Report. State DOTs will report the 2017 on-road CO<sub>2</sub> emissions on the NHS in the first Biennial Performance Report. State DOTs will use the 2017 reference value calculated for the first Biennial Performance Report in future Biennial Performance Reports unless FHWA posts on its Web site that there has been a change that warrants recalculation of the 2017 value, in which case the State DOT will provide an updated value in the next Biennial Performance Report. State DOTs will report the GHG metric and total annual CO<sub>2</sub> emissions, every 2 years in their Biennial Performance Report for each of the preceding 2 calendar years. In doing this, the State DOT can either acquire the data needed for both years at once to calculate the metric, or they can calculate the metric each year. In either case, the State DOT will report both years to FHWA at one time in their Biennial Performance Report.

#### Discussion Section of § 490.513 Calculation of System Performance Measures

Section 490.513(a) has been revised to more clearly identify that State DOTs and MPOs will calculate measures in this section for the purpose of carrying out the system performance related performance requirements of part 490 and that FHWA will calculate measures in this section for the purpose of making significant progress determinations and for reporting on system performance.

<sup>69</sup> Note that the highway use fuel sales data in MF-21 includes only the fuel that is used to power on-road vehicles and does not include the fuel used for road construction or off-road activities such as powering lawn-mowers and construction equipment.

<sup>70</sup> [www.eia.gov/todayinenergy/detail.php?id=26092](http://www.eia.gov/todayinenergy/detail.php?id=26092).

<sup>71</sup> Travel on the NHS accounts for approximately 55 percent of total U.S. VMT, varying by State.

<sup>72</sup> FHWA recognizes that this is not a perfect proxy, as speeds, operating conditions, and vehicle types on the NHS differ from those on other roads and differ between states. However, in balancing the competing goals of simplicity and precision, FHWA believes that this approach provides actionable information that DOTs and MPOs can use in evaluating system performance and making decisions, without significantly increasing workloads.

<sup>73</sup> Or EMFAC in California.

Section 490.513(a) Through (c)—  
Calculation of Reliability Measures

Section 490.513 has been revised to change the measure calculation method to add in weighting for person-miles traveled. The NHPP Reliability measure is calculated by summing the product of the total annual traffic volume, the average occupancy factor, and the segment length for each reporting segment that is exhibiting a LOTTR below 1.50 and comparing this, as a percentage, to the total person-miles traveled on the full system. This method has been designed to accommodate unique occupancy factors for each reporting segment if this information is available through data tables provided by FHWA as discussed in section 490.509.

Section 490.513(d)—Calculation of the  
GHG Measure

Total annual tons of CO<sub>2</sub> emissions from on-road transportation sources on the NHS are expressed as a percent change from 2017, computed to the nearest tenth of a percent. This is in accordance with common practice of expressing GHG emissions goals in terms of a percent change from a certain year.

*C. Subpart F—National Performance  
Management Measures for Freight  
Movement on the Interstate*

Discussion of Section 490.607  
National Performance Management  
Measure To Assess Freight Movement  
on the Interstate System

The FHWA has eliminated the performance measure for Percent of Interstate System Mileage Uncongested. The final and sole performance measure for freight will be Truck Travel Time Reliability Index, which represents the average reliability index of all reporting segments on the Interstate system.

Discussion of Section 490.609 Data  
Requirements

Consistent with changes to sections 490.509 and 490.511(b), FHWA has revised the time bin intervals in this section from 5 to 15 minutes. This rule also revises the approach to missing data, adopting a requirement that when truck travel times are not available in the travel time data set (data not reported, or reported as “0” or null) for a given 15 minute interval, the missing travel time will be replaced with an observed travel time that represents all traffic on the roadway during the same 15 minute interval (“all vehicles” in NPRMDS nomenclature). Changes were also made to the method to replace missing truck travel times to remove the

requirement to only allow all vehicle travel times to be used as a replacement for truck travel times when this time was less than or equal to the posted speed limit. The FHWA also added a provision allowing State DOTs to exclude time periods when an NHS roadway is closed.

Discussion of Section 490.611  
Calculation of Freight Movement Metric

First, as discussed in section 490.607, the Percent of the Interstate System Mileage providing for Reliable Truck Travel Time proposed in the NPRM has been renamed the Truck Travel Time Reliability (TTTR) Index. Second, the TTTR Index has been revised in several ways.

The TTTR Index measure now includes five time period components to better consider the variability in travel times experienced by trucks during all hours of the day and throughout the year. These time periods were selected to be consistent with the time periods used to calculate the LOTTR as proposed in the NPRM and finalized in section 490.511. As discussed in §§ 490.511 and 490.611, FHWA revised the data bins to use 15-minute intervals. The TTTR Index metrics are calculated as the ratio of the 95th percentile travel time divided by the 50th percentile travel time for each segment and each time period.

The reporting of the metric has been revised to require the reporting of the TTTR Index, the 95th percentile travel time, and the 50th percentile travel time for each of the five time periods for each reporting segment.

Discussion of Section 490.613  
Calculation of Freight Movement  
Measure

Section 490.613(a) has been revised to more clearly identify that State DOTs and MPOs will calculate measures in this section for the purpose of carrying out the freight related performance requirements of part 490 and that FHWA will calculate measures in this section for the purpose of making significant progress determinations and for reporting on freight performance.

The method for calculating the freight performance measure has been changed from the proposed Percent of the Interstate System Mileage Providing for Reliable Truck Travel Times to a TTTR Index for the five time periods noted in § 490.611. Instead of using a threshold for determining if a section of Interstate is reliable, as proposed in the NPRM, an index is calculated and averaged for the entire Interstate in the State. The average TTTR Index is calculated by multiplying the maximum TTTR Index

metric of all 5 time periods for each reporting segment by the length of the reporting segment, then the sum of all segments is divided by the total length of Interstate to generate an average TTTR Index for the entire applicable area. This approach to calculating the measure will differentiate it from the NHPP Travel Time Reliability measure, and remove the expectation to maintain a TTTR below 1.50 to better recognize incremental improvements to system performance.

*D. Subpart G—National Performance  
Measures for CMAQ Program—Traffic  
Congestion*

Discussion Section of § 490.703  
Applicability

The FHWA has decided to phase-in this expansion of the applicability of the CMAQ Traffic Congestion measures to medium-sized urbanized areas, recognizing that calculating the Peak Hour Excessive Delay (PHED) measure may be burdensome in the short term for some smaller urbanized areas in light of other new performance measure requirements.

The CMAQ Traffic Congestion measures of PHED and Modal Share focus on addressing traffic congestion that contributes to air pollution in areas classified as in nonattainment or maintenance under the Clean Air Act. The final rule revises §§ 490.703 and 490.105(e)(8)(i), (e)(8)(ii), (f)(5)(i), and (f)(5)(ii) so that the CMAQ Traffic Congestion measures in section 490.707 initially apply to the urbanized area with a population of more than 1 million that contains any part of nonattainment or maintenance areas, before expanding to nonattainment or maintenance areas with a population over 200,000 for the second and all subsequent performance periods.

The FHWA also revised section 490.703 to base the applicability on urbanized area attributes (existence of NHS mileage, population, and attainment status). The proposed section in the NPRM applied the measure to the NHS. This was changed because the new non-SOV travel measure applies beyond the NHS.

Discussion Section of § 490.705  
Definitions

The FHWA limits the excessive delay measure to peak hours, which are revised from the peak hours in the Peak Hour Travel Time Reliability measure in the NPRM. The peak periods in the final rule include 9:00 to 10:00 a.m. and to provide flexibility to State DOTs and MPOs to add a fourth hour (either 3:00 to 4:00 p.m. or 7:00 to 8:00 p.m.) for the

afternoon peak period. The FHWA provides flexibility only within the 6:00 a.m. to 8:00 p.m. time period to be consistent with the dataset used in the reliability measure under section 490.103.

FHWA revises the speed threshold in the final rule to be 60 percent of the posted speed limit with a minimum of 20 mph.

#### Discussion Section of § 490.707 National Performance Management Measures for Traffic Congestion

In the NPRM, FHWA proposed excessive delay per capita as the measure of traffic congestion under CMAQ. This measure has been revised as described in section 490.705 to reflect the total peak hour excessive delay experienced by all travelers, normalized by the total population in the applicable area. In this final rule, the revised measure is peak hour excessive delay per capita.

The FHWA revised section 490.707 in the final rule to include a new measure under the CMAQ program that reflects the percentage of non-single occupancy vehicle trips taken by travelers within an urbanized area. This measure will help State DOTs and MPOs better understand the impact of lower-emission travel methods on their congestion profile and area air quality.

#### Discussion Section of § 490.709 Data Requirements

##### Discussion Section 490.709(a) Through (e)—Data Requirements for the Annual Hours of Peak Hour Excessive Delay Per Capita Measure

The FHWA retained the data requirements to determine hourly traffic volumes proposed in the NPRM and added a new allowance in section 490.709(c)(5) for travel times that represent periods when the roadway is closed.

The FHWA added § 490.709(d) and (e) in the final rule to establish the data needed to estimate the impact of travel time delay on all travelers. The method is used to group roadway traffic on the NHS into three types of vehicles, including: Trucks, buses, and cars and then estimates the total number people traveling by applying occupancy factors for these vehicles, respectively.

Section 490.709(d) has been established to specify the allowable methods to determine the volume of buses, trucks, and cars as a percentage of daily traffic using each roadway segment. Two methods are specified that provide State DOTs the option of determining the percentage of the three vehicle groups based on annual traffic

volume counts collected by continuous count stations or by using the average annual counts provided in the HPMS for each segment. State DOTs are required to distribute the traffic volumes to different directions of roadway when using the HPMS data to estimate volumes.

Section 490.709(e) has been established to specify the allowable methods to determine vehicle occupancy factors for buses, trucks, and cars. State DOTs have the option to use occupancy factors provided by FHWA and/or develop occupancy factors that are more specific than those provided by FHWA. The latter will be useful when specific strategies are used to increase person throughput (e.g., construction of high occupancy lanes, dedicated bus lanes, ride sharing). The FHWA intends to develop default occupancy factors for each applicable urbanized area using bus ridership data provided in the NTD and car occupancy rates derived from national travel surveys, such as the NHTS and ACS. A default occupancy factor of 1.0 will be used for trucks. The FHWA intends to update these occupancy factors on a routine basis. To supplement the default occupancy factors, State DOTs and MPOs are provided the option to develop occupancy factors for sections of NHS roads where more specific data on vehicle occupancy is available. This option will be useful when specific strategies are used to increase person throughput such as the construction of high occupancy lanes, dedicated bus lanes, and ride sharing.

##### Discussion Section 490.709(f)—Data Requirements for the Percentage of Non- SOV Travelled Measure

The FHWA revises section 490.709(f) in the final rule to include data requirements for the measure of non-SOV mode share. The FHWA provides State DOTs and MPOs with several data options for calculating this measure. One option is to use Table DP03 of the ACS for the urban area to estimate the total percent of non-SOV commuting to work travel in the urbanized area. A second option is for State DOTs or MPOs to use local surveys to estimate the percentage of non-SOV travel occurring in the urbanized areas. These surveys may focus on either household or work travel and must be conducted within the 2 years before the start of the performance period and be updated on at least a biennial frequency. A third option is for State DOTs and MPOs to estimate the percent of non-SOV travel based on volume measurements of actual use of each transportation mode, including but not limited to cars,

bicycles, pedestrian travel, travel avoided by telework, and on-road bus transit. Use or development of the third option is encouraged by FHWA as it will provide the most accurate data for future use. State DOTs and MPOs have flexibility to determine which of these count methodologies to use and are required to report these methodologies to FHWA. State DOTs are also encouraged to report these use counts to currently available national data sources, including the Travel Monitoring Analysis System (TMAS).

The FHWA revises section 490.709(g) that determines which State DOTs and MPOs are required to implement both CMAQ traffic congestion measures in § 490.707(a) and (b). This determination will be based on the most recent annual populations published by the U.S. Census of urbanized areas available 1 year before the State DOT Baseline Performance Period Report is due to FHWA. As a result of this revision, § 490.105(e)(8)(iii)(D) and (f)(5)(iii)(D) are revised in the final rule. As for computing the Annual Hours of Peak Hour Excessive Delay Per Capita in section 490.713(b), FHWA revises section 490.709(g) to state that the most recent annual population reported by the U.S. Census, at the time when the State DOT Biennial Performance Period is due to FHWA.

##### Discussion Section 490.709(h)— Population and Nonattainment and Maintenance Area Data Requirements for Both Traffic Congestion Measures

The FHWA revises section 490.709(h) in the final rule to be consistent with the revised section 490.807(c), which includes the language that nonattainment and maintenance areas will be revised if changes to the designations made by EPA are effective 1 year before the State DOT Mid Performance Period Progress Report is due to FHWA. As discussed in section 490.101 maintenance areas that have reached the end of their 20-year maintenance period will not be subject to the requirements of this subpart.

##### Discussion Section of § 490.711 Calculation of Traffic Congestion Metrics

The FHWA revised the metric for the Peak Hour Excessive Delay per capita measure to be a reflection of person hours of delay instead of vehicle hours of delay as proposed in the NPRM. The new metric, Total Peak Hour Excessive Delay (person-hours), is calculated for each reporting segment and reported annually to FHWA. There is no metric required for the Percent non-SOV travel



measure as segment level data is not available for this measure.

The FHWA revises section 490.711(b)(1) for the peak period to include 9:00 to 10:00 a.m. and to provide flexibility to State DOTs and MPOs to add a fourth hour (either 3:00 to 4:00 p.m. or 7:00 to 8:00 p.m.) for the afternoon peak period consistent with the changes made to section 490.705. The FHWA provides flexibility within the 6:00 a.m. to 8:00 p.m. time period to be consistent with the dataset used in the reliability measure under § 490.103.

The FHWA changed the length of the NPMRDS time bins from 5 minutes to 15 minutes. This also changed the maximum travel time segment delay from 300 seconds to 900 seconds. The hourly volume is thus divided by four instead of 12.

The FHWA revised section 490.711(e) to express the PHED in person-hours of delay by incorporating average vehicle occupancy (AVO) into the calculation of the delay metric. To incorporate AVO into the metric, State DOTs will refer to either the AVO information for cars, buses, and trucks provided by FHWA or their own AVO information along with information about the percentage of cars, buses, and trucks as a share of total AADT to calculate a weighted AVO. This weighted AVO will then be multiplied by the vehicle-hours of excessive delay to establish the total person-hours of excessive delay. The FHWA recognizes the variations in AVO among and within urbanized areas and the challenges in obtaining segment-level AVOs. The FHWA will provide AVO for cars, trucks, and on-road bus transit for applicable urbanized areas. The FHWA also recognizes that urbanized areas may have more specific AVO data and thus, provides flexibility for State DOTs and MPOs to substitute these data.

#### Discussion Section of § 490.713 Calculation of Traffic Congestion Measures

Section 490.713(a) has been revised to more clearly identify that State DOTs and MPOs will calculate measures in this section for the purpose of carrying out the traffic congestion related performance requirements of part 490 and that FHWA will calculate measures in this section for the purpose of reporting on PHED performance.

The method to calculate the Excessive Delay per capita measure proposed in the NPRM has been retained in the final rule for the PHED per capita measure as the changes to limit to peak hours and account for all travelers are contained within the metric calculation discussed in the section 490.711. The measure is

calculated by summing the hours of excessive delay experienced by all travelers on all reporting segments by the most recent annual population estimate published by the U.S. Census for the applicable area.

The FHWA revises the final rule to include a measure of non-SOV mode share, providing flexibility for State DOTs and MPOs to choose between three options for calculating this measure. When employing the option using ACS data to calculate the percent non-SOV travel, State DOTs and MPOs calculate the measure by subtracting the estimated percent SOV from 100 percent. When employing the option using data derived from local surveys, State DOTs and MPOs will report the results of their calculations (as a percent of non-SOV travel). When employing the option using data derived from system use measurements to calculate percent non-SOV travel, State DOTs and MPOs will divide the non-SOV volume by total volume, where non-SOV volume includes travel modes other than driving alone in a motorized vehicle, including travel avoided by teleworking.

In addition, in recognition of expected improvements in the ability to accurately measure multimodal travel, FHWA plans to revisit this measure after the completion of FHWA's multimodal research study in Fall 2018.

#### *E. Subpart H—National Performance Measure for the CMAQ Program—On Road Mobile Source Emissions*

##### Discussion Section of § 490.803 Applicability

The performance measure is applicable to all States and MPOs with projects financed with funds from the 23 U.S.C. 149 CMAQ program apportioned to State DOTs for areas designated as nonattainment or maintenance for ozone (O<sub>3</sub>), carbon monoxide (CO), or particulate matter (PM).

##### Discussion Section of § 490.805 Definitions

The proposed definitions of “donut area” and “isolated rural nonattainment and maintenance areas” were removed because those terms do not appear in the final regulation.

##### Discussion Section of § 490.809 Data Requirements

Section 490.809(c) was revised to specify that the baseline nonattainment and maintenance area designations should be based on area status one year before the date that the State DOT Baseline Performance Period Report is

due to FHWA, which means as of October 1, 2017, for the first State DOT Baseline Performance Period Report. The FHWA also revised the language in section 490.809(c) so that the nonattainment and maintenance areas will be revised if an area is no longer nonattainment or maintenance for any pollutant in section 490.803. This determination will be based on area status 1 year before the State DOT Mid Performance Period Progress Report is due to FHWA.

##### Discussion Section of § 490.811 Calculation of Emissions Metric

Section 490.811 as proposed in the NPRM was removed in response to comments.

##### Discussion Section of Former § 490.813 Calculation of Emissions Measure

Section 490.813 in the NPRM has been renumbered as § 490.811 in the final rule, due to the deletion of proposed § 490.811 regarding an emissions metric. The section was also revised due to the removal of the emissions metric as that resulted in a change in the units for the emissions measure in this section.

## VII. Rulemaking Analyses and Notices

The FHWA considered all comments received before the close of business on the comment closing date indicated above. The comments are available for examination in the docket FHWA–2013–0054 at [www.regulations.gov](http://www.regulations.gov).

#### *A. Rulemaking Analysis and Notices Executive Order 12866 (Regulatory Planning and Review), Executive Order 13563 (Improving Regulation and Regulatory Review), and DOT Regulatory Policies and Procedures*

The FHWA has determined that this action is a significant regulatory action within the meaning of Executive Order (E.O.) 12866 and within the meaning of DOT regulatory policies and procedures due to the significant public interest in regulations related to performance management. It is anticipated that the economic impact of this rulemaking will not be economically significant within the meaning of E.O. 12866 as discussed below. This action complies with E.O.s 12866 and 13563 to improve regulation. This action is considered significant because of widespread public interest in the transformation of the Federal-aid highway program to be performance-based, although it is not economically significant within the meaning of E.O. 12866. The FHWA is presenting an RIA (or regulatory impact analysis) in support of the final rule on Assessing Performance of the National Highway

System, Freight Movement on the Interstate System, and Congestion Mitigation and Air Quality Improvement Program. The RIA evaluates the economic impact, in terms of costs and benefits, on Federal, State, and local governments, as well as private entities regulated under this action, as required by E.O. 12866 and E.O. 13563. However, the RIA did not attempt to directly quantify the changes from the improved decisionmaking. The estimated costs are measured on an incremental basis, relative to current NHS performance, freight movement, and traffic congestion and emissions reporting practices.

The RIA estimated costs and benefits resulting from the final rule in order to inform policymakers and the public of its relative value. The complete RIA may be accessed from the docket (docket number FHWA–2013–0054).

The cornerstone of MAP–21's highway program transformation is the transition to a performance-based program. In accordance with the law, State DOTs will invest resources in projects to achieve performance targets that make progress toward national goal

areas. The MAP–21 establishes national performance goals for system reliability, freight movement and economic vitality, and environmental sustainability.

This final rule establishes performance measures to assess the following: System performance on the Interstate System and non-Interstate NHS for the purpose of carrying out the NHPP, freight movement on the Interstate, and traffic congestion and on-road mobile source emissions for the purpose of carrying out the CMAQ program. The three NHPP-related measures are (1) Percent of person-miles traveled on reliable Interstate System roadways, (2) Percent of person-miles traveled on reliable non-Interstate NHS roadways, and (3) Percent Change in Tailpipe CO<sub>2</sub> Emissions on the NHS from the Calendar Year 2017. The performance measure to assess freight movement on the Interstate is Weighted Percent of the Interstate System Mileage providing for Reliable Truck Travel Times. The three measures to assess the CMAQ program includes two measures for traffic congestion: (1) Annual Hours of Peak-Hour Excessive Delay Per Capita and (2) Percent of non-Single

Occupancy Vehicle (SOV) Travel—and one measure to assess on-road mobile source emissions—Total Emission Reductions for applicable criteria pollutants or precursors.

#### Estimated Cost of the Final Rule

To estimate costs, FHWA assessed the level of effort, expressed in labor hours and categories, and the capital needed to comply with each component of the final rule. Level of effort by labor category is monetized with loaded wage rates to estimate total costs.

Because there is some uncertainty regarding the availability of NPMRDS data for use by State DOTs and MPOs, FHWA estimated the cost of the final rule according to two scenarios. Under Scenario 1, FHWA assumes that it will provide State DOTs and MPOs with the required data from NPMRDS. Table 3 displays the total cost of the final rule under Scenario 1 for the 10-year study period (2017–2026). Total costs are estimated to be \$144.0 million undiscounted, \$106.4 million discounted at 7 percent, and \$125.5 million discounted at 3 percent.

TABLE 3—TOTAL COST OF THE FINAL RULE UNDER SCENARIO 1

Cost components	10-year total cost		
	Undiscounted	7%	3%
Section 490.103—Data Requirements .....	\$20,329,609	\$15,104,439	\$17,776,941
Intake and Process DOT Travel Time Data .....	15,325,924	11,094,661	13,258,812
NPMRDS Data Acquisition .....	3,600,000	2,606,093	3,114,444
NPRMDS Data Training .....	523,963	523,963	523,963
NPMRDS Data Reconciliation .....	879,722	879,722	879,722
Section 490.105–490.109—Reporting Requirements .....	90,533,557	67,705,203	79,346,012
Document and Submit Description of Coordination Between State DOTs and MPOs .....	2,547,274	2,547,274	2,547,274
Establish and Update Performance Targets .....	36,356,497	27,788,508	32,168,577
Reporting on Performance Targets Progress .....	35,446,842	25,738,285	30,683,726
Prepare CMAQ Performance Plan .....	14,887,674	10,810,080	12,887,165
Assess Significant Progress Toward Achieving Performance Targets .....	1,248,936	782,529	1,016,682
Adjust HPMS to Handle Data in TMC Format and Design Post-Submission Reports .....	26,182	24,469	25,420
Data Processing (e.g., Data Verification) .....	20,152	14,058	17,168
Section 490.511—Calculation of Performance Metrics for NHS Performance .....	5,681,474	4,088,067	4,902,708
Calculate LOTTR .....	2,711,510	1,938,066	2,333,323
Calculate Annual Total Tailpipe CO <sub>2</sub> Emissions on the NHS .....	2,969,964	2,150,001	2,569,385
Section 490.513—Calculation of Performance Measures for NHS Performance .....	3,266,268	2,371,668	2,827,368
Calculate Interstate and Non-Interstate NHS Travel Time Reliability Performance Measures .....	3,186,603	2,313,822	2,758,408
Calculate Percent Change in Tailpipe CO <sub>2</sub> Emissions on the NHS Compared to the Calendar Year 2017 Level Performance Measure .....	79,665	57,846	68,960
Section 490.611—Calculation of Freight Movement Metric .....	1,611,187	1,207,755	1,414,654
Calculate Truck Travel Time Reliability Index Metric .....	1,611,187	1,207,755	1,414,654
Section 490.613—Calculation of Freight Movement Measure .....	7,647,847	5,553,174	6,620,179
Calculate Truck Travel Time Reliability Index Performance Measure .....	7,647,847	5,553,174	6,620,179
Section 490.711—Calculation of Traffic Congestion Metric .....	6,227,101	4,357,789	5,308,381
Calculate Total Peak Hour Excessive Delay Metric .....	6,227,101	4,357,789	5,308,381
Section 490.713—Calculation of Traffic Congestion Measures .....	6,015,878	4,056,117	5,045,792
Calculate Annual Hours of Peak Hour Excessive Delay Performance Measure .....	5,917,257	3,989,623	4,963,074
Calculate Percent Non-SOV Travel Performance Measure .....	98,621	66,494	82,718
Section 490.813—Calculation of Emissions Measure .....	2,660,121	1,931,539	2,302,671
Calculate Total Emissions Reduction Performance Measure .....	2,660,121	1,931,539	2,302,671
Total Cost of Final Rule .....	143,973,042	106,375,750	125,544,706

\* Totals may not sum due to rounding.

Under Scenario 2, which represents “worst case” conditions, State DOTs will choose to independently acquire the necessary data. Table 4 displays the total cost of the final rule under Scenario 2 for the 10-year study period (2017–2026). Total costs over 10 years are estimated to be \$205.5 million undiscounted, \$153.1 million discounted at 7 percent, and \$179.8 million at 3 percent.

TABLE 4—TOTAL COST OF THE FINAL RULE UNDER SCENARIO 2

Cost Components	10-year total cost		
	Undiscounted	7%	3%
Section 490.103—Data Requirements .....	\$81,838,250	\$61,852,128	\$72,074,370
Acquire Freight and General Traffic Data .....	51,000,000	38,327,684	44,809,156
Adjust Contract for Freight-only Data .....	9,000,000	6,763,709	7,907,498
Remove Estimated Data Values from Database .....	3,405,761	2,559,508	2,992,339
Intake and Process .....	17,028,804	12,797,542	14,961,693
Data Training .....	523,963	523,963	523,963
Data Reconciliation .....	879,722	879,722	879,722
Section 490.105–490.109—Reporting Requirements .....	90,533,557	67,705,203	79,346,012
Document and Submit Description of Coordination Between State DOTs and MPOs .....	2,547,274	2,547,274	2,547,274
Establish and Update Performance Targets .....	36,356,497	27,788,508	32,168,577
Reporting on Performance Targets Progress .....	35,446,842	25,738,285	30,683,726
Prepare CMAQ Performance Plan .....	14,887,674	10,810,080	12,887,165
Assess Significant Progress Toward Achieving Performance Targets .....	1,248,936	782,529	1,016,682
Adjust HPMS to Handle Data in TMC Format and Design Post-Submission Reports .....	26,182	24,469	25,420
Data Processing (e.g., Data Verification) .....	20,152	14,058	17,168
Section 490.511—Calculation of Performance Metrics for NHS Performance .....	5,681,474	4,088,067	4,902,708
Calculate LOTTR .....	2,711,510	1,938,066	2,333,323
Calculate Annual Total Tailpipe CO <sub>2</sub> Emissions on the NHS .....	2,969,964	2,150,001	2,569,385
Section 490.513—Calculation of Performance Measures for NHS Performance .....	3,266,268	2,371,668	2,827,368
Calculate Interstate and Non-Interstate NHS Travel Time Reliability Performance Measures .....	3,186,603	2,313,822	2,758,408
Calculate Percent Change in Tailpipe CO <sub>2</sub> Emissions on the NHS Compared to the Calendar Year 2017 Level Performance Measure .....	79,665	57,846	68,960
Section 490.611—Calculation of Freight Movement Metric .....	1,611,187	1,207,755	1,414,654
Calculate Truck Travel Time Reliability Index Metric .....	196,486	183,632	190,763
Section 490.613—Calculation of Freight Movement Measure .....	7,647,847	5,553,174	6,620,179
Calculate Truck Travel Time Reliability Index Performance Measure .....	7,647,847	5,553,174	6,620,179
Section 490.711—Calculation of Traffic Congestion Metric .....	6,227,101	4,357,789	5,308,381
Calculate Total Peak Hour Excessive Delay Metric .....	1,843,947	1,260,566	1,556,458
Section 490.713—Calculation of Traffic Congestion Measures .....	6,015,878	4,056,117	5,045,792
Calculate Annual Hours of Peak Hour Excessive Delay Per Capita Performance Measure .....	5,917,257	3,989,623	4,963,074
Calculate Percent of Non-SOV Travel Performance Measure .....	98,621	66,494	82,718
Section 490.813—Calculation of Emissions Measure .....	2,660,121	1,931,539	2,302,671
Calculate Total Emissions Reduction Performance Measure .....	2,660,121	1,931,539	2,302,671
Total Cost of Final Rule .....	205,481,684	153,123,439	179,842,135

\* Totals may not sum due to rounding.

The costs in Tables 3 and 4 assume a portion of the estimated 409 MPOs will establish their own targets, and the rest will adopt State DOT targets. It is assumed that State DOTs and MPOs serving Transportation Management Areas (TMA)<sup>74</sup> will use staff to establish performance targets. Conversely, it is assumed that MPOs not serving a TMA will agree to plan and program projects so that they contribute toward the accomplishment of the relevant State DOT targets. Therefore, they will not incur any incremental costs. There are currently an estimated 201 MPOs

serving TMAs.<sup>75</sup> The FHWA made this assumption because larger MPOs may have more resources available to develop performance targets. The FHWA believes that this is a conservative estimate, as larger MPOs may elect not to establish their own targets for a variety of reasons, including resource availability.

The final rule’s 10-year undiscounted cost (\$144.0 million in Scenario 1 and

\$205.5 million in Scenario 2, in 2014 dollars) decreased relative to the proposed rule (\$165.3 million in Scenario 1 and \$224.5 million in Scenario 2, in 2012 dollars). As discussed below, FHWA made a number of changes that affected cost.

#### General Updates

In the final rule RIA, FHWA updated all costs to 2014 dollars from the 2012 dollars used in the proposed rule RIA. In addition, FHWA updated labor costs to reflect current BLS data. These general updates increased the estimated cost of the final rule relative to the proposed rule.

The FHWA deferred the effective date from 2016 to 2017 and shortened the period of analysis from 11 years in the proposed rule to 10 years in the final rule. All costs that related to activities

<sup>74</sup> A TMA is an urbanized area having a population of over 200,000 or otherwise requested by the Governor and the MPO and officially designated by FHWA or FTA. 23 U.S.C. 134(k).

<sup>75</sup> The FHWA updated the estimated total number of MPOs to 409, which is less than the 420 MPOs used at the time that the NPRM was published. The estimated number of MPOs serving TMAs is now 201, less than the estimate of 210 in the NPRM. At the time the RIA was prepared for the NPRM, FHWA assumed that the 36 new urbanized areas resulting from the 2010 Census would have MPOs designated for them. In reality, some of the newly designated urbanized areas merged with existing MPOs, resulting in the designation of fewer new MPOs than expected.



that were scheduled to begin in 2016 under the NPRM will now begin in 2017, and costs are estimated for 10 years instead of 11 years to be consistent with the other two performance measure rulemaking RIAs. This reduction in the period of analysis led FHWA to remove the cost of the Initial Performance Report, which State DOTs have already submitted to the agency. Therefore, estimated costs of the final rule decreased relative to the proposed rule.

The FHWA also updated the estimated total number of MPOs to 409, which is less than the 420 MPOs used at the time that the NPRM was published. The estimated number of MPOs serving TMAs is now 201, less than the estimate of 210 in the NPRM. The number of non-TMA MPOs is 208, less than the estimate of 210 in the NPRM. At the time the RIA was prepared for the NPRM, FHWA assumed that the 36 new urbanized areas resulting from the 2010 Census would have MPOs designated for them. However, some of these newly designated urbanized areas merged with existing MPOs, resulting in the designation of fewer new MPOs than expected. The FHWA estimates that, on average, only the 201 larger MPOs serving TMAs will establish their own quantifiable performance targets. The FHWA also estimates that the 208 smaller MPOs serving non-TMAs will choose to agree to plan and program projects so that they contribute toward the accomplishment of State DOT NHS performance, freight movement, and traffic congestion and emissions condition-related performance targets. Therefore, only the 201 larger MPOs serving TMAs will incur costs to reprogram and upgrade their software to be able to perform calculations of the performance measures. The reduction in the number of MPOs decreased the estimated costs to comply with the requirements of the final rule relative to the proposed rule.

#### Other Updates

In the final rule, FHWA eliminated three of the proposed performance measures (one of the proposed freight measures for percent of the Interstate congested and merging two proposed peak-hour travel time measures under NHPP with proposed excessive delay measure under CMAQ Traffic Congestion into one measure under CMAQ). In addition, the final rule does not include one of the proposed performance metrics (On-Road Mobile Source Emissions). At the same time, the final rule created two new performance measures (Percent of Non-SOV Travel and Percent Change in

Tailpipe CO<sub>2</sub> Emissions on the NHS Compared to the Calendar Year 2017 Level). Additionally, in the RIA, FHWA adjusted estimates for level of effort and number of affected State DOTs and MPOs to be consistent with the final rule requirements. On balance, these changes reduced the total estimated cost of the final rule relative to the proposed rule.

#### Break-Even Analysis

Currently, State DOTs differ in the way they evaluate the performance of the NHS, freight movement, traffic congestion, and on-road mobile source emissions. These differences hinder accurate analysis at the national level. The final rulemaking will not only establish uniform performance measures, but also will establish processes that (1) State DOTs and MPOs use to report measures and establish performance targets and (2) FHWA uses to assess progress that State DOTs have made toward achieving targets.

Upon implementation, FHWA expects that the will rule will result in some significant benefits that are not easily monetized, but nonetheless deserve mention in this analysis. Specifically, the final rule will allow for more informed decisionmaking on traffic congestion-, freight-, and air-quality-related project, program, and policy choices. The final rule also will yield greater accountability because the MAP-21-mandated reporting will increase visibility and transparency. In addition the final rule will help focus the Federal-aid highway program on achieving balanced performance outcomes.

The expected benefits discussed above (*i.e.*, more informed decisionmaking, greater accountability, and the focus on making progress toward the national goal for infrastructure condition) will lead to an enhanced performance of the NHS due to reduced traffic congestion, improved freight movement, and reduced emissions. The benefits, while real and substantial, are difficult to forecast and monetize. Therefore, FHWA addresses this issue by using the break-even analysis method suggested by OMB Circular A-4. Break-even analyses calculate the threshold a specific variable must achieve in order for benefits to equal costs while holding every other variable in the analysis constant.

The FHWA identified four variables (or outcomes) for which to estimate break-even thresholds: (1) Number of passenger travel hours, (2) tons of transportation-related carbon dioxide emissions, (3) number of truck travel

hours, and (4) kilograms of on-road mobile source emissions, comprising volatile organic compounds, nitrogen oxide, particulate matter, and carbon monoxide. The FHWA selected these variables because it is reasonable to assume that the performance measures will influence each of these variables relative to current baseline levels.

After identifying these variables, FHWA combined the final rule costs associated with the performance measures that will influence each variable. The FHWA expects that implementation of four of the rule's performance measures (Percent of Person-Miles Traveled on the Interstate That Are Reliable, Percent of Person-Miles Traveled on the Non-Interstate NHS That Are Reliable, Annual Hours of Peak Hour Excessive Delay Per Capita, and Percent of Non-SOV Travel) will influence passenger travel hours. The FHWA expects that implementation of the performance measure for Percent Change in Tailpipe CO<sub>2</sub> Emissions on the NHS Compared to the Calendar Year 2017 Level will influence tons of carbon dioxide emissions. The FHWA expects that implementation of the performance measure for Truck Travel Time Reliability Index will influence number of truck travel hours. The FHWA expects that implementation of the performance measure for Total Emissions Reduction will influence kilograms of on-road mobile source emissions.

The FHWA chose to present two of the break-even variables (number of passenger travel hours and tons of carbon dioxide emissions) together because the performance measure expected to improve tons of carbon dioxide emissions, Percent Change in Tailpipe CO<sub>2</sub> Emissions on the NHS Compared to the Calendar Year 2017 Level, is one of three performance measures used to assess the performance of the Interstate System and the non-Interstate NHS for the purpose of carrying out the National Highway Performance Program (NHPP). The other two performance measures under NHPP are Percent of Person-Miles Traveled on the Interstate That Are Reliable and Percent of Person-Miles Traveled on the Non-Interstate NHS That Are Reliable, both of which are expected to influence passenger travel hours. In order to assess NHPP performance measures together, FHWA presents the break-even thresholds for these variables together. The remaining two performance measures included in the break-even analysis for number of passenger travel hours (Annual Hours of Peak Hour Excessive Delay Per Capita and Percent of Non-SOV Travel) assess

the CMAQ program but are expected to influence passenger travel hours.

Two variables (number of passenger travel hours and number of truck travel hours) are associated with performance measures whose costs differ under two scenarios feasible under the final rule; in Scenario 1, FHWA provides travel time data to State DOTs, in Scenario 2, State DOTs acquire the necessary data independently. To account for this, FHWA performed the break-even analyses twice for these two variables (*i.e.*, once using Scenario 1 costs, and a second time using Scenario 2 costs). The costs associated with the remaining two variables (tons of carbon dioxide emissions and kilograms of on-road mobile source emissions) do not change under Scenarios 1 and 2, therefore only one break-even threshold is calculated for each analysis. In all, FHWA presents six break-even thresholds: (1) Number of passenger travel hours under Scenario 1, (2) number of passenger travel hours under Scenario 2, (3) tons of carbon dioxide emissions, (4) number of truck travel hours under Scenario 1, (5) number of truck travel hours under Scenario 2, and (6) kilograms of on-road mobile source emissions.

For the break-even analyses associated with passenger travel hours

and tons of carbon dioxide emissions, FHWA summed the costs associated with the following final rule sections:

- Sections 490.103. Seventy-five percent of the total cost of complying with the data requirements;
- Section 490.105. Approximately 71 percent of the cost of establishing performance targets;
- Section 490.107. Approximately 71 percent of the cost of documenting and submitting a description of coordination between State DOTs and MPOs;
- Section 490.107. Approximately 71 percent of the cost of reporting performance targets;
- Section 490.107. Approximately 67 percent of the cost of preparing CMAQ performance plan;
- Section 490.107. Seventy-five percent of the cost of adjusting HPMS and processing data;
- Section 490.109. Cost of assessing significant progress for NHPP measures;
- Section 490.511. The cost of calculating the system performance metrics;
- Section 490.513. The cost of calculating the system performance management measures;
- Section 490.711. Cost of calculating the traffic congestion metric; and
- Section 490.713. Cost of calculating the traffic congestion measure.

Table 5 presents the savings in passenger travel hours and carbon dioxide emissions that the final rule under Scenario 1 would need to save in order to be cost-beneficial (*i.e.*, FHWA provides NPMRDS data to State DOTs). The results represent two break-even points: (1) The passenger car travel time (in hours) that will need to be saved in order to justify the costs, and (2) the amount of carbon dioxide emissions (in tons) that will need to be saved in order to justify the costs. The analysis shows that the final rule will need to result in the reduction of approximately 370,000 hours of passenger car travel time, or 3.7 million hours over 10 years, as well as 31,000 tons of carbon dioxide emissions, or 312,000 tons over 10 years. To provide context, private commuters in 471 urban areas across the United States experience 6.9 billion hours of travel delay per year.<sup>76</sup> The EPA data indicates that the transportation sector emitted approximately 1.74 billion tons of carbon dioxide in 2014.<sup>77</sup> As a result, the reduction represents a less than 0.01 percent decrease in the amount of travel delay per year for major U.S. urban areas and in the average annual amount of carbon dioxide emissions from the transportation sector.

TABLE 5—BREAK-EVEN ANALYSIS OF NHPP AND CMAQ TRAFFIC CONGESTION PERFORMANCE MEASURES UNDER SCENARIO 1

	Undiscounted 10-year costs	Average commuter value of time (\$ per hour)	Number of hours of travel that need to be reduced	Average annual number of hours of travel that need to be reduced
	a	b	c = a ÷ b	d = c ÷ 10
Passenger Travel Hours .....	\$86,069,537	\$23.42	3,674,733	367,473
	Undiscounted 10-year costs	Average emission ton cost (\$ per ton)	Number of emissions tons needed to be reduced	Average annual number of emissions tons needed to be reduced
Carbon dioxide emissions .....	\$13,906,452	\$44.53	312,302	31,230

Table 6 presents the results from the break-even analysis under Scenario 2 (*i.e.*, State DOTs independently acquire the necessary data). The results represent two break-even points: (1) The passenger car travel time (in hours) that will need to be saved in order to justify the costs, and (2) the amount of carbon

dioxide emissions (in tons) that will need to be saved in order to justify the costs. The analysis shows that the final rule will need to result in the reduction of approximately 560,000 hours annually, or 5.6 million hours over 10 years as well as 31,000 tons of carbon dioxide emissions, or 312,000 tons over

10 years. To provide context, private commuters in 471 urban areas across the United States experience 6.9 billion hours of travel delay per year.<sup>78</sup> The EPA data indicates that the transportation sector emitted approximately 1.74 billion tons of

<sup>76</sup> Texas A&M Transportation Institute, "2015 Urban Mobility Scorecard," 2014, Table 2, p. 25. <http://d2dtl5nnlppfr0r.cloudfront.net/tti.tamu.edu/documents/mobility-scorecard-2015.pdf>.

<sup>77</sup> In 2014, the transportation sector accounted for 1.74 billion tons of carbon dioxide emissions, according to the EPA's Greenhouse Gas Inventory Data Explorer.

<sup>78</sup> Texas A&M Transportation Institute, "2015 Urban Mobility Scorecard," 2014, Table 2, p. 25. <http://d2dtl5nnlppfr0r.cloudfront.net/tti.tamu.edu/documents/mobility-scorecard-2015.pdf>.

carbon dioxide in 2014.<sup>79</sup> As a result, the reduction represents a less than 0.01 percent decrease in the amount of travel

delay per year for major U.S. urban areas and in the average annual amount

of carbon dioxide emissions from the transportation sector.

TABLE 6—BREAK-EVEN ANALYSIS OF NHPP AND CMAQ TRAFFIC CONGESTION PERFORMANCE MEASURES UNDER SCENARIO 2

	Undiscounted 10-year costs	Average commuter value of time (\$ per hour)	Number of hours of travel that need to be reduced	Average annual number of hours of travel that need to be reduced
	a	b	c = a ÷ b	d = c ÷ 10
Passenger travel hours .....	\$132,201,018	\$23.42	5,644,314	564,431
	Undiscounted 10-year costs	Average emission ton cost (\$ per ton)	Total number of emissions tons that need to be reduced	Average annual number of emissions tons that need to be reduced
Carbon dioxide emissions .....	\$13,906,452	\$44.53	312,302	31,230

\* Please refer to the Summary Report for details on the methodology used in the analysis.

Relative to the proposed rule, the thresholds for the NHS performance break-even analysis increased in the final rule. Specifically, under Scenario 1, the number of annual hours of reduction in passenger car travel time increased from approximately 350,000 in the proposed rule to approximately 370,000 in the final rule. Under Scenario 2, the number of annual hours of reduction in passenger car travel time increased from approximately 500,000 in the proposed rule to 560,000 in the final rule. The break-even points increased primarily due to the addition of the Percent of Non-SOV Travel performance measure. No break-even point was estimated for carbon dioxide emissions in the proposed rule stage because the relevant performance measure, Percent Change in Tailpipe CO<sub>2</sub> Emissions on the NHS Compared to

the Calendar Year 2017 Level, was added to the final rule.

For the break-even analyses associated with improving freight performance, the costs associated with the following final rule sections are summed together to estimate the total cost of provisions aimed at reducing freight congestion:

- Section 490.103. Twenty-five percent of the cost of obtaining data requirements;
- Section 490.105. Approximately 14 percent of the cost of establishing performance targets;
- Section 490.107. Approximately 14 percent of the cost of documenting and submitting a description of coordination between State DOTs and MPOs;
- Section 490.107. Approximately 14 percent of the cost of reporting performance targets;
- Section 490.107. Twenty-five percent of the cost of adjusting HPMS and processing data;

- Section 490.109. Cost of assessing significant progress for NHFP measure;
- Section 490.611. Cost of calculating freight movement metric; and
- Section 490.613. Cost of calculating freight movement measure.

Table 7 presents the results from the freight movement break-even analysis under Scenario 1. The results represent the freight travel time (in hours) that will need to be saved in order to justify the costs. The analysis shows that the final rule will need to result in the reduction of approximately 98,000 hours annually, or 982,000 hours over 10 years. To provide context, truck drivers in 498 urban areas across the United States experience 353 million hours of travel delay per year.<sup>80</sup> This reduction represents a 0.03 percent decrease in the amount of travel delay per year for major U.S. urban areas.

TABLE 7—BREAK-EVEN ANALYSIS OF NHFP PERFORMANCE MEASURE UNDER SCENARIO 1

Undiscounted 10-year costs	Average truck value of time (\$ per hour)	Number of hours of travel that need to be reduced	Average annual number of hours of travel that need to be reduced
A	B	c = a ÷ b	d = c ÷ 10
\$25,752,858 .....	\$26.22	982,239	98,224

<sup>79</sup>In 2014, the transportation sector accounted for 1.74 billion tons of carbon dioxide emissions, according to the EPA's Greenhouse Gas Inventory Data Explorer.

<sup>80</sup>Texas A&M Transportation Institute, "TTI's 2012 Urban Mobility Report," 2011, Table 5, p. 43. <https://assets.documentcloud.org/documents/566377/2012-urban-mobility-report.pdf>.



Table 8 presents the results from the freight movement break-even analysis under Scenario 2 (*i.e.*, State DOTs independently acquire the necessary data). The results represent the freight travel time (in hours) that will need to

be saved in order to justify the costs. The analysis shows that the final rule will need to result in the reduction of approximately 157,000 hours annually, or 1.6 million hours over 10 years. To provide context, truck drivers in 498

urban areas across the United States experience 353 million hours of travel delay per year.<sup>81</sup> This reduction represents a 0.04 percent decrease in the amount of travel delay per year for major U.S. urban areas.

TABLE 8—BREAK-EVEN ANALYSIS OF NHFP PERFORMANCE MEASURE UNDER SCENARIO 2

Undiscounted 10-year costs	Average truck value of time (\$ per hour)	Number of hours of travel that need to be reduced	Average annual number of hours of travel that need to be reduced
A	B	c = a ÷ b	d = c ÷ 10
\$41,130,019 .....	\$26.22	1,568,738	156,874

\* Please refer to the Summary Report for details on the methodology used in the analysis.

Relative to the proposed rule, the thresholds for the freight performance break-even analysis decreased in the final rule. Specifically, under Scenario 1, the number of annual hours of reduction in freight travel time decreased from approximately 140,000 in the proposed rule to 98,000 in the final rule. Under Scenario 2, the number of annual hours of reduction in freight travel time decreased from 250,000 in the proposed rule to 160,000 in the final rule. The break-even points decreased primarily due to the elimination of the Average Truck Speed performance measure.

For the break-even analysis associated with the performance measure for Total

Emissions Reduction, the costs associated with the following final rule sections are summed together to estimate the total cost of provisions aimed at reducing total emissions:

- Section 490.105. Approximately 14 percent of the cost of establishing performance targets;
- Section 490.107. Approximately 14 percent of the cost of documenting and submitting a description of coordination between State DOTs and MPOs;
- Section 490.107. Approximately 14 percent of the cost of reporting performance targets;
- Section 490.107. Approximately 33 percent of the cost of preparing CMAQ performance plan;

- Section 490.811. Cost of calculating emissions metric; and
- Section 490.813. Cost of calculating emissions measure.

Tables 9, 10, and 11 present the results from the total emissions break-even analysis. The costs associated with the Total Emissions Reduction performance measure are identical under Scenario 1 and Scenario 2 because State DOTs would not need data from NPMRDS. Therefore, FHWA presents one set of results. The results represent the amount of emissions (in kilograms) that will need to be reduced in order to justify the costs. To calculate the cost of a kilogram of emissions, the analysis used the following inputs:

TABLE 9—INPUTS FOR CALCULATING COST PER KILOGRAM OF EMISSIONS

Emission	Passenger consumption rate (grams per VMT)	Percentage of "emission kilogram"	Societal cost of emissions (\$ per long ton)	Weighted "emission kilogram"
	A	b = a ÷ Σa	C	d = b c
Volatile Organic Compound (VOC) .....	1.034	9.289	\$1.46	\$0.14
Nitrogen Oxide (NO <sub>x</sub> ) .....	0.693	6.226	5.96	0.37
Particulate Matter (PM <sub>2.5</sub> ) .....	0.0041	0.037	325.88	0.12
Carbon Monoxide (CO) .....	9.4	84.448	0.00	0.00
Cost of an Emission Kilogram .....				0.63

Based on this cost per kilogram, the analysis shows that the final rule will need to result in the reduction of approximately 2.9 million kilograms annually, or 29.1 million kilograms over

10 years. To provide context, data from the EPA Office of Air Quality Planning and Standards indicate that highway vehicles emitted 2 billion kilograms of VOCs, 4.1 billion kilograms of NO<sub>x</sub>, 0.2

billion kilograms of PM<sub>2.5</sub>, and 20.2 billion kilograms CO in 2014.<sup>82</sup> This reduction represents approximately 0.01 percent of total annual national emissions of these pollutants.

<sup>81</sup> Texas A&M Transportation Institute, "TTI's 2012 Urban Mobility Report," 2011, Table 5, p. 43. <https://assets.documentcloud.org/documents/566377/2012-urban-mobility-report.pdf>.

<sup>82</sup> EPA, "Air Pollutant Emissions Trends Data," Average Annual Emissions. <https://www.epa.gov/air-emissions-inventories/air-pollutant-emissions-trends-data>.

TABLE 10—BREAK-EVEN ANALYSIS OF TOTAL EMISSIONS REDUCTION PERFORMANCE MEASURE USING EMISSION KILOGRAM METRIC

Undiscounted 10-year costs	Average emission kilogram cost (\$ per long ton)	Number of emissions kilograms needed to be reduced	Average annual number of emissions kilograms needed to be reduced
a	B	c = a ÷ b	d = c ÷ 10
\$18,244,195 .....	\$0.63	29,119,356	2,911,936

This amount was split into specific emissions reductions in volatile organic compounds, nitrogen oxide, particulate matter 2.5, and carbon monoxide. Table 11 shows these reductions.

TABLE 11—CALCULATION OF AVERAGE ANNUAL REQUIRED EMISSIONS REDUCTION

Average annual number of emissions kilograms needed to be reduced	
VOC Kilograms .....	270,498
NO <sub>x</sub> Kilograms .....	181,291
PM <sub>2.5</sub> Kilograms .....	1,073
CO Kilograms .....	2,459,074
Total "Emission" Kilograms .....	2,911,936

Relative to the proposed rule, the thresholds for the total emissions break-even analysis decreased in the final rule. Specifically, the reduction in total emissions decreased from 4,400 emission tons (approximately 4 million kilograms<sup>83</sup>) in the proposed rule to 2.9 million emission kilograms in the final rule. The break-even points decreased primarily due to the elimination of the performance metric for on-road mobile source emissions.

#### Responses to Public Comments on the NPRM's Regulatory Impact Analysis

A number of State DOTs, MPOs, and other organizations provided comments on the regulatory impact analysis for the NPRM.<sup>84</sup> In terms of benefits, the Association for Commuter Transportation, an advocacy group, expressed support and asserted that the costs of the rule are minimal relative to the planning process used to determine how to spend nearly \$50 billion a year.

The Michigan and Montana DOTs and Sarasota/Manatee MPO claimed that the costs of the rule do not justify the

benefits. As described in Section 5 of the RIA, FHWA believes that the final rule will result in many benefits (both qualitative and quantitative). Through five break-even analyses, FHWA demonstrates the levels of change needed to justify the costs of the rule. The full analysis is available in the docket of this final rulemaking.

The AMPO asserted that the rule will require MPOs to adjust current operations to accommodate new roles and responsibilities. The final rule for Statewide and Nonmetropolitan Transportation Planning; Metropolitan Transportation Planning (Docket No. FHWA–2013–0037) accounts for activities unique to this planning process, including specific items suggested by this commenter. The FHWA considered the new roles and responsibilities MPOs would face under the final rule, separately from costs related to the planning process so as not to double count effort, and estimated the associated costs in this final rule's RIA. For a detailed description of the analysis, see Section 4 of the RIA found in the docket of this rulemaking.

The Denver Regional Council of Governments and the New York Metropolitan Transportation Council suggested that FHWA underestimated the costs of the rule. Under the final rule, MPOs are not required to provide separate reporting to FHWA, but must agree on a reporting process with State DOTs and report certain requirements to the State. The final rule for Statewide

and Nonmetropolitan Transportation Planning; Metropolitan Transportation Planning (Docket No. FHWA–2013–0037) accounts for activities unique to this planning process. The FHWA, however, has estimated the costs for State DOTs and MPOs to prepare and submit reports as well as the costs of all other provisions specific to this final rule. For a detailed analysis, see Section 4 of the RIA.

Two commenters questioned FHWA's estimate of the cost of data requirements. The Oregon Department of Transportation and the Washington State Department of Transportation requested more details from FHWA on the costs of obtaining NPMRDS if FHWA does not provide the data to State DOTs. Due to uncertainty regarding the long-term funding of NPMRDS, FHWA estimated the costs of this rule under two scenarios: One in which NPMRDS data are made available to State DOTs and another in which State DOTs must acquire their own data. Based on interviews with Federal and State DOT SMEs, FHWA confirmed that the data required for calculating performance metrics and measures are readily accessible from the NPMRDS or equivalent data sources. Use of NPMRDS or other data sources would constitute an incremental burden on State DOTs in the form of sharing data, training staff, acquiring and processing data, and other processes. The level of this burden would depend on each individual State DOT's existing level of

<sup>83</sup> Using a conversion rate of 1 U.S. ton = 907.185 kilograms.

<sup>84</sup> Association of Metropolitan Planning Organizations, Denver Regional Council of Governments, Association for Commuter Transportation, Michigan Department of Transportation, Montana Department of Transportation, New York Metropolitan Transportation Council, Oregon Department of Transportation, Sarasota/Manatee Metropolitan Planning Organization, Washington State Department of Transportation.

sophistication in current roadway traffic data analysis. For a detailed analysis, see Section 4 of the RIA.

#### *B. Regulatory Flexibility Act*

In compliance with the Regulatory Flexibility Act (Pub. L. 96–354, 5 U.S.C. 601–612), FHWA has evaluated the effects of this action on small entities and has determined that the action would not have a significant economic impact on a substantial number of small entities. The final rule addresses the obligation of Federal funds to State DOTs for Federal-aid highway projects. The rule affects two types of entities: State governments and MPOs. State governments do not meet the definition of a small entity under 5 U.S.C. 601, which have a population of less than 50,000.

The MPOs are considered governmental jurisdictions, and to qualify as a small entity they would need to serve less than 50,000 people. The MPOs serve urbanized areas with populations of 50,000 or more. As discussed in the RIA, the rule is expected to impose costs on MPOs that serve populations exceeding 200,000. Therefore, the MPOs that incur economic impacts under this proposed rule do not meet the definition of a small entity.

I hereby certify that this regulatory action would not have a significant impact on a substantial number of small entities.

#### *C. Unfunded Mandates Reform Act of 1995*

The FHWA has determined that this action does not impose unfunded mandates as defined by the Unfunded Mandates Reform Act of 1995 (Pub. L. 104–4, March 22, 1995, 109 Stat. 48). This rule does not include a Federal mandate that may result in expenditures of \$151 million or more in any 1 year (when adjusted for inflation) in 2012 dollars for either State, local, and tribal governments in the aggregate, or by the private sector. Additionally, the definition of “Federal mandate” in the Unfunded Mandates Reform Act excludes financial assistance of the type in which State, local, or tribal governments have authority to adjust their participation in the program in accordance with changes made in the program by the Federal Government. The Federal-aid highway program permits this type of flexibility.

#### *D. Executive Order 13132 (Federalism Assessment)*

The FHWA has analyzed this action in accordance with the principles and criteria contained in Executive Order

13132. The FHWA has determined that this action does not have sufficient federalism implications to warrant the preparation of a federalism assessment. The FHWA has also determined that this action does not preempt any State law or State regulation or affect the States’ ability to discharge traditional State governmental functions.

#### *E. Executive Order 12372 (Intergovernmental Review)*

The regulations implementing Executive Order 12372 regarding intergovernmental consultation on Federal programs and activities apply to this program. Local entities should refer to the Catalog of Federal Domestic Assistance Program Number 20.205, Highway Planning and Construction, for further information.

#### *F. Paperwork Reduction Act*

Under the Paperwork Reduction Act of 1995 (PRA) (44 U.S.C. 3501, *et seq.*), Federal agencies must obtain approval from the OMB for each collection of information they conduct, sponsor, or require through regulations. The DOT has analyzed this action under the PRA and has determined that this rulemaking contains collection of information requirements for the purposes of the PRA.

This rule provides definitions and outlines processes for performance elements of this final rule. Some burdens in this rule would be realized in other reporting areas as described below. The PRA activities that are already covered by existing OMB Clearances have reference numbers for those clearances as follows: HPMS information collection, OMB No. 2125–0028 with an expiration of May 2019 and CMAQ Program OMB 2125–0614 with an expiration date of August 2018. Any increase in PRA burdens caused by MAP–21 and the FAST Act in these areas will be addressed in PRA approval requests associated with those rulemakings.

This rulemaking requires the submittal of performance reports. The DOT has analyzed this final rule under the PRA and has determined the following:

*Respondents:* Approximately 262 applicants consisting of State DOTs and MPOs.

*Frequency:* Biennially.

*Estimated Average Burden per*

*Response:* Approximately 416 hours to complete and submit the report.

*Estimated Total Annual Burden*

*Hours:* Approximately 65,312 hours annually.

#### *G. National Environmental Policy Act*

The FHWA has analyzed this action for the purpose of the National Environmental Policy Act of 1969, as amended (42 U.S.C. 4321 *et seq.*), and has determined that this action would not have any effect on the quality of the environment and meets the criteria for the categorical exclusion at 23 CFR 771.117(c)(20).

#### *H. Executive Order 12630 (Taking of Private Property)*

The FHWA has analyzed this action under Executive Order 12630, Governmental Actions and Interference with Constitutionally Protected Property Rights. The FHWA does not anticipate that this action would affect a taking of private property or otherwise have taking implications under Executive Order 12630.

#### *I. Executive Order 12988 (Civil Justice Reform)*

This action meets applicable standards in sections 3(a) and 3(b)(2) of Executive Order 12988, Civil Justice Reform, to minimize litigation, eliminate ambiguity, and reduce burden.

#### *J. Executive Order 13045 (Protection of Children)*

We have analyzed this rule under Executive Order 13045, Protection of Children from Environmental Health Risks and Safety Risks. The FHWA certifies that this action would not cause an environmental risk to health or safety that might disproportionately affect children.

#### *K. Executive Order 13175 (Tribal Consultation)*

The FHWA has analyzed this action under Executive Order 13175, dated November 6, 2000, and believes that the action would not have substantial direct effects on one or more Indian tribes; would not impose substantial direct compliance costs on Indian tribal governments; and would not preempt tribal laws. The rulemaking addresses obligations of Federal funds to State DOTs for Federal-aid highway projects and would not impose any direct compliance requirements on Indian tribal governments. Therefore, a tribal summary impact statement is not required.

#### *L. Executive Order 13211 (Energy Effects)*

The FHWA has analyzed this action under Executive Order 13211, Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use. The FHWA has



determined that this is not a significant energy action under that order and is not likely to have a significant adverse effect on the supply, distribution, or use of energy. Therefore, a Statement of Energy Effects is not required.

*M. Executive Order 12898  
(Environmental Justice)*

The E.O. 12898 requires that each Federal agency make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minorities and low-income populations. The FHWA has determined that this rule does not raise any environmental justice issues.

*N. Privacy Impact Assessment*

The FHWA continues to assess the privacy impacts of this rule as required by section 522(a)(5) of the FY 2005 Omnibus Appropriations Act, Public Law 108-447, 118 Stat. 3268 (December 8, 2004) [set out as a note to 5 U.S.C. 552a].

The FHWA has selected the use of the new NPMRDS as the data source to calculate the metrics for the travel time/speed based measures to ensure consistency and coverage at a national level. This private sector data set provides average travel times derived from vehicle/passenger probe data traveling on the NHS. The FHWA recognizes that probe data is an evolving field and we will continue to evaluate the privacy risks associated with its use.

*O. Regulation Identifier Number*

An RIN is assigned to each regulatory action listed in the Unified Agenda of Federal Regulations. The Regulatory Information Service Center publishes the Unified Agenda in April and October of each year. The RIN number contained in the heading of this document can be used to cross-reference this action with the Unified Agenda.

**List of Subjects in 23 CFR Part 490**

Bridges, Highway safety, Highways and roads, Incorporation by reference, Reporting and recordkeeping requirements.

Issued in Washington, DC, on January 9, 2017, under authority delegated in 49 CFR 1.85.

**Gregory G. Nadeau,**  
*Administrator, Federal Highway Administration.*

In consideration of the foregoing, FHWA amends 23 CFR part 490 as follows:

**PART 490—NATIONAL  
PERFORMANCE MANAGEMENT  
MEASURES**

■ 1. The authority citation for part 490 continues to read as follows:

**Authority:** 23 U.S.C. 134, 135, 148(i), and 150; 49 CFR 1.85.

■ 2. Revise subpart A to read as follows:

**Subpart A—General Information**

Sec.

490.101 Definitions.

490.103 Data requirements.

490.105 Establishment of performance targets.

490.107 Reporting on performance targets.

490.109 Assessing significant progress toward achieving the performance targets for the National Highway Performance Program and the National Highway Freight Program.

490.111 Incorporation by reference.

**§ 490.101 Definitions.**

Unless otherwise specified, the following definitions apply to this part:

*American Community Survey (ACS)* is a national level ongoing survey from the U.S. Census Bureau that includes data on jobs, occupations, educational attainment, transportations patterns, and other topics of the Nation's population.

*Attainment area* as used in this part is defined in § 450.104 of this chapter, Transportation Planning and Programming Definitions.

*Bridge* as used in this part is defined in § 650.305 of this chapter, the National Bridge Inspection Standards.

*Criteria pollutant* is any pollutant for which there is established a NAAQS at 40 CFR part 50. The transportation related criteria pollutants per 40 CFR 93.102(b)(1) are carbon monoxide, nitrogen dioxide, ozone, and particulate matter (PM<sub>10</sub> and PM<sub>2.5</sub>).

*Full extent* means continuous collection and evaluation of pavement condition data over the entire length of the roadway.

*Highway Performance Monitoring System (HPMS)* is a national level highway information system that includes data on the extent, condition, performance, use, and operating characteristics of the Nation's highways.

*Mainline highways* means the through travel lanes of any highway. Mainline highways specifically exclude ramps, shoulders, turn lanes, crossovers, rest areas, and other pavement surfaces that are not part of the roadway normally traveled by through traffic.

*Maintenance area* as used in this part is defined in § 450.104 of this chapter, Transportation Planning and Programming Definitions. For the

purposes of this part, areas that have reached the end of their 20-year maintenance period<sup>1</sup> are not considered as maintenance areas.

*Measure* means an expression based on a metric that is used to establish targets and to assess progress toward achieving the established targets (e.g., a measure for flight on-time performance is percent of flights that arrive on time, and a corresponding metric is an arithmetic difference between scheduled and actual arrival time for each flight).

*Metric* means a quantifiable indicator of performance or condition.

*Metropolitan Planning Organization (MPO)* as used in this part is defined in § 450.104 of this chapter, Transportation Planning and Programming Definitions.

*Metropolitan Planning Area* as used in this part is defined in § 450.104 of this chapter, Transportation Planning and Programming Definitions.

*National Ambient Air Quality Standards (NAAQS)* as used in this part is defined in § 450.104 of this chapter, Transportation Planning and Programming Definitions.

*National Bridge Inventory (NBI)* is an FHWA database containing bridge information and inspection data for all highway bridges on public roads, on and off Federal-aid highways, including tribally owned and federally owned bridges, that are subject to the National Bridge Inspection Standards (NBIS).

*National Performance Management Research Data Set (NPMRDS)* means a data set derived from vehicle/passenger probe data (sourced from Global Positioning Station (GPS), navigation units, cell phones) that includes average travel times representative of all traffic on each mainline highway segment of the National Highway System (NHS), and additional travel times representative of freight trucks for those segments that are on the Interstate System. The data set includes records that contain average travel times for every 15 minutes of every day (24 hours) of the year recorded and calculated for every travel time segment where probe data are available. The NPMRDS does not include any imputed travel time data.

*Nonattainment area* as used in this part is defined in § 450.104 of this chapter, Transportation Planning and Programming Definitions.

<sup>1</sup> The maintenance period in CAA Section 175A (42 U.S.C. 7505a) requires the submittal of two maintenance plans totaling 20 years, unless the applicable implementation plan specifies a longer maintenance period. The end of the maintenance period is 20-years from the effective date of the re-designation to attainment and approval of the first 10-year maintenance plan.

*Non-SOV travel* is defined as any travel mode other than driving alone in a motorized vehicle (*i.e.*, single occupancy vehicle or SOV travel), including travel avoided by telecommuting.

*Non-urbanized area* means a single geographic area that comprises all of the areas in the State that are not “urbanized areas” under 23 U.S.C. 101(a)(34).

*Performance period* means a determined time period during which condition/performance is measured and evaluated to: Assess condition/performance with respect to baseline condition/performance; and track progress toward the achievement of the targets that represent the intended condition/performance level at the midpoint and at the end of that time period. The term “performance period” applies to all measures in this part, except the measures for the Highway Safety Improvement Program (HSIP) in subpart B of this part. Each performance period covers a 4-year duration beginning on a specified date (provided in § 490.105).

*Reporting segment* means the length of roadway that the State Department of Transportation (DOT) and MPOs define for metric calculation and reporting and is comprised of one or more travel time segments.

*Target* means a quantifiable level of performance or condition, expressed as a value for the measure, to be achieved within a time period required by the Federal Highway Administration (FHWA).

*Transportation Management Area (TMA)* as used in this part is defined in § 450.104 of this chapter, Transportation Planning and Programming Definitions.

*Travel time data set* means either the NPMRDS or an equivalent data set that is used by State DOTs and MPOs as approved by FHWA, to carry out the requirements in subparts E, F, and G of this part.

*Travel time reliability* means the consistency or dependability of travel times from day to day or across different times of the day.

*Travel time segment* means a contiguous stretch of the NHS for which average travel time data are summarized in the travel time data set.

*Truck freight bottleneck*, as used in this part, is defined as a segment of roadway identified by the State DOT as having constraints that cause a significant impact on freight mobility and reliability. Bottlenecks may include highway sections that do not meet thresholds for freight reliability identified in § 490.613 or other locations identified by the State DOT. Causes may

include recurring congestion, causing delays in freight movement, or roadway features that impact truck movements, such as steep grades, substandard vertical or horizontal clearances, weight restrictions, delays at border crossings or terminals, or truck operating restrictions.

#### § 490.103 Data requirements.

(a) *In general.* Unless otherwise noted in paragraphs (b) through (g) of this section, the data requirements in this section apply to the measures identified in subparts C through H of this part. Additional data requirements for specific performance management measures are identified in 23 CFR sections—

- (1) 490.309 for the condition of pavements on the Interstate System;
- (2) 490.309 for the condition of pavements on the non-Interstate NHS;
- (3) 490.409 for the condition of bridges on the NHS;
- (4) 490.509 for the performance of the Interstate System;
- (5) 490.509 for the performance of the non-Interstate NHS;
- (6) 490.609 for the freight movement on the Interstate System;
- (7) 490.709 for traffic congestion; and
- (8) 490.809 for on-road mobile source emissions.

(b) *Urbanized area data.* The State DOTs shall submit urbanized area data, including boundaries of urbanized areas, in accordance with the HPMS Field Manual for the purpose of the additional targets for urbanized and non-urbanized areas in § 490.105(e) and establishing and reporting on targets for the CMAQ Traffic Congestion measures in § 490.707. The boundaries of urbanized areas shall be identified based on the most recent U.S. Decennial Census, unless FHWA approves adjustments to the urbanized area as provided by 23 U.S.C. 101(a)(34) and these adjustments are submitted to HPMS.

(c) *Nonattainment and maintenance areas data.* The State DOTs shall use the nonattainment and maintenance areas boundaries based on the effective date of U.S. Environmental Protection Agency (EPA) designations in 40 CFR part 81.

(d) *National Highway System data.* The State DOTs shall document and submit the extent of the NHS in accordance with the HPMS Field Manual.

(e) *Travel time data set.* Travel time data needed to calculate the measures in subparts E, F, and G of this part will come from the NPMRDS, unless the State DOT requests, and FHWA approves, the use of an equivalent data

source(s) that meets the requirements of this section. The State DOT shall establish, in coordination with applicable MPOs, a single travel time data set (*i.e.*, NPMRDS or equivalent data set) that will be used to calculate the annual metrics in subparts E, F, and G of this part. The same data source shall be used for each calendar year. A State DOT and MPO(s) must use the same travel time data set for each reporting segment for the purposes of calculating the metrics and measures. The use of equivalent data source(s) shall comply with the following:

(1) State DOTs and MPOs shall use the same equivalent data source(s) for a calendar year;

(2) The State DOT shall request FHWA approval for the use of such equivalent data source(s) no later than October 1st before the beginning of the calendar year in which the data source would be used to calculate metrics and FHWA must approve the use of that data source prior to a State DOT and MPO(s)’s implementation and use of that data source;

(3) The State DOT shall make the equivalent data source(s) available to FHWA, on request;

(4) The State DOT shall maintain and use a documented data quality plan to routinely check the quality and accuracy of data contained within the equivalent data source(s); and

(5) If approved by FHWA, the equivalent data source(s) shall:

- (i) Be used by both the State DOT and all MPOs within the State for all applicable travel time segments and be referenced by HPMS location referencing standards; and
- (ii) In combination with or in place of NPMRDS data, include:

(A) Contiguous segments that cover the mainline highways full NHS, as defined in 23 U.S.C. 103, within the State and MPO boundary; and

(B) Average travel times for at least the same number of 15 minute intervals and the same locations that would be available in the NPMRDS;

(iii) Be populated with observed measured vehicle travel times and shall not be populated with travel times derived from imputed (historic travel times or other estimates) methods. Segment travel times may be derived from travel times reported over a longer time period of measurement (path processing or equivalent);

(iv) Include, for each segment at 15 minute intervals throughout the time periods specified in paragraphs (e)(5)(iv)(A) and (B) of this section for each day of the year, the average travel time, recorded to the nearest second,



representative of at least one of the following:

(A) All traffic on each segment of the NHS (24 hours on Interstate; 6 a.m. to 8 p.m. for non-Interstate NHS); or

(B) Freight vehicle traffic on each segment of the Interstate System (24 hours);

(v) Include, for each segment, a recording of the time and date of each 15 minute travel time record;

(vi) Include the location (route, functional class, direction, State), length and begin and end points of each segment; and

(vii) Be available within 60 days of measurement.

(f) *Reporting segments.* State DOTs, in coordination with MPOs, shall define a single set of reporting segments of the Interstate System and non-Interstate NHS for the purpose of calculating the travel time-based measures specified in §§ 490.507, 490.607, and 490.707 in accordance with the following:

(1) Reporting segments shall be comprised of one or more contiguous Travel Time Segments of same travel direction. State DOTs have the option to accept the Travel Time Segments in the NPMRDS as the reporting segments;

(2) Reporting segments shall not exceed 1 mile in length in urbanized areas unless an individual Travel Time Segment is longer and 10 miles in length in non-urbanized areas unless an individual Travel Time Segment is longer;

(3) All reporting segments collectively shall be contiguous and cover the full extent of the directional mainline highways of the Interstate System and non-Interstate NHS required for reporting the measure; and

(4) The State DOT and applicable MPOs shall document, in manner that mutually agreed upon by all relevant parties, the coordination and agreement on the travel time data set and the defined reporting segments.

(g) *Posted speed limit.* State DOTs are encouraged to report the posted speed limits for the full extent of the NHS in their State via HPMS (HPMS Data Item "Speed\_Limit").

#### **§ 490.105 Establishment of performance targets.**

(a) *In general.* State DOTs shall establish performance targets for all measures specified in paragraph (c) of this section for the respective target scope identified in paragraph (d) of this section with the requirements specified in paragraph (e) of this section. The MPOs shall establish performance targets for all measures specified in paragraph (c) of this section for respective target scope identified in

paragraph (d) of this section with the requirements specified in paragraph (f) of this section.

(b) *Highway Safety Improvement Program measures.* State DOTs and MPOs shall establish performance targets for the Highway Safety Improvement Program (HSIP) measures in accordance with § 490.209.

(c) *Applicable measures.* State DOTs and MPOs that include, within their respective geographic boundaries, any portion of the applicable transportation network or area shall establish performance targets for the performance measures identified in 23 CFR sections—

(1) 490.307(a)(1) and (2) for the condition of pavements on the Interstate System;

(2) 490.307(a)(3) and (4) for the condition of pavements on the NHS (excluding the Interstate);

(3) 490.407(c)(1) and (2) for the condition of bridges on the NHS;

(4) 490.507(a)(1) and (2) for the NHS Travel Time Reliability;

(5) 490.507(b) for the greenhouse gas (GHG) performance for the NHS;

(6) 490.607 for the freight movement on the Interstate System;

(7) 490.707(a) and (b) for traffic congestion; and

(8) 490.807 for on-road mobile source emissions.

(d) *Target scope.* Targets established by State DOTs and MPOs shall, regardless of ownership, represent the transportation network or geographic area, including bridges that cross State borders, that are applicable to the measures as specified in paragraphs (d)(1) and (2) of this section.

(1) State DOTs and MPOs shall establish statewide and metropolitan planning area wide targets, respectively, that represent the condition/performance of the transportation network or geographic area that are applicable to the measures, as specified in 23 CFR sections—

(i) 490.303 for the condition of pavements on the Interstate System measures specified in § 490.307(a)(1) and (2);

(ii) 490.303 for the condition of pavements on the NHS (excluding the Interstate) measures specified in § 490.307(a)(3) and (4);

(iii) 490.403 for the condition of bridges on the NHS measures specified in § 490.407(c)(1) and (2);

(iv) 490.503(a)(1) for the Travel Time Reliability measures specified in § 490.507(a)(1) and (2);

(v) 490.503(b) for the GHG measure for the NHS specified in § 490.507(b);

(vi) 490.603 for the Freight Reliability measure specified in § 490.607; and

(vii) 490.803 for the Total Emissions Reduction measure identified in § 490.807.

(2) State DOTs and MPOs shall establish a single urbanized area target that represents the performance of the transportation network in each applicable area for the CMAQ Traffic Congestion measures, as specified in § 490.703.

(3) For the purpose of target establishment in this section and reporting targets and progress evaluation in § 490.107, State DOTs shall describe the urbanized area boundaries within the State boundary in the Baseline Performance Period Report required by § 490.107(b)(1).

(e) *Establishment.* State DOTs shall establish targets for each of the performance measures identified in paragraph (c) of this section for respective target scope identified in paragraph (d) of this section as follows:

(1) *Schedule.* State DOTs shall establish targets not later than February 20, 2018, and for each performance period thereafter, in a manner that allows for the time needed to meet the requirements specified in this section and so that the final targets are submitted to FHWA by the due date provided in § 490.107(b).

(2) *Coordination.* State DOTs shall coordinate with relevant MPOs on the selection of targets in accordance with 23 U.S.C. 135(d)(2)(B)(i)(II) to ensure consistency, to the maximum extent practicable.

(3) *Additional targets for urbanized and non-urbanized areas.* In addition to statewide targets, described in paragraph (d)(1) of this section, State DOTs may, as appropriate, for each statewide target establish additional targets for portions of the State.

(i) State DOTs shall describe in the Baseline Performance Period Report required by § 490.107(b)(1) the boundaries used to establish each additional target.

(ii) State DOTs may select any number and combination of urbanized area boundaries and may also select a non-urbanized area boundary for the establishment of additional targets.

(iii) The boundaries used by the State DOT for additional targets shall be contained within the geographic boundary of the State.

(iv) State DOTs shall evaluate separately the progress of each additional target and report that progress as required under § 490.107(b)(2)(ii)(B) and (b)(3)(ii)(B).

(v) Additional targets for urbanized areas and the non-urbanized area are not applicable to the CMAQ Traffic Congestion measures and the Total



Emissions Reduction measure in paragraphs (c)(7) and (8) of this section, respectively.

(4) *Time horizon for targets.* State DOTs shall establish targets for a performance period as follows:

(i) The performance period will begin on:

(A) January 1st of the year in which the Baseline Performance Period Report is due to FHWA and will extend for a duration of 4 years for the measures in paragraphs (c)(1) through (7) of this section; and

(B) October 1st of the year prior to which the Baseline Performance Report is due to FHWA and will extend for a duration of 4 years for the measure in paragraph (c)(8) of this section.

(ii) The midpoint of a performance period will occur 2 years after the beginning of a performance period described in paragraph (e)(4)(i) of this section.

(iii) Except as provided in paragraphs (e)(7) and (e)(8)(v) of this section, State DOTs shall establish 2-year targets that reflect the anticipated condition/performance level at the midpoint of each performance period for the measures in paragraphs (c)(1) through (7) of this section, and the anticipated cumulative emissions reduction to be reported for the first 2 years of a performance period by applicable criteria pollutant and precursor for the measure in paragraph (c)(8) of this section.

(iv) State DOTs shall establish 4-year targets that reflect the anticipated condition/performance level at the end of each performance period for the measures in paragraphs (c)(1) through (7) of this section, and the anticipated cumulative emissions reduction to be reported for the entire performance period by applicable criteria pollutant and precursor for the measure in paragraph (c)(8) of this section.

(5) *Reporting.* State DOTs shall report 2-year targets, 4-year targets, the basis for each established target, progress made toward the achievement of targets, and other requirements to FHWA in accordance with § 490.107. State DOTs shall provide relevant MPO(s) targets to FHWA, upon request, each time the relevant MPOs establish or adjust MPO targets, as described in paragraph (f) of this section.

(6) *Target adjustment.* State DOTs may adjust an established 4-year target in the Mid Performance Period Progress Report, as described in § 490.107(b)(2). State DOTs shall coordinate with relevant MPOs when adjusting their 4-year target(s). Any adjustments made to 4-year targets established for the CMAQ Traffic Congestion measures in

paragraph (c)(7) of this section shall be agreed upon and made collectively by all State DOTs and MPOs that include any portion of the NHS in the respective urbanized area applicable to the measures.

(7) *Phase-in of new requirements for Interstate System pavement condition measures and the non-Interstate NHS Travel Time Reliability measures.* The following requirements apply only to the first performance period and to the measures in §§ 490.307(a)(1) and (2) and 490.507(a)(2):

(i) State DOTs shall establish their 4-year targets, required under paragraph (e)(4)(iv) of this section, and report these targets in their Baseline Performance Period Report, required under § 490.107(b)(1);

(ii) State DOTs shall not report 2-year targets, described in paragraph (e)(4)(iii) of this section, and baseline condition/performance in their Baseline Performance Period Report; and

(iii) State DOTs shall use the 2-year condition/performance in their Mid Performance Period Progress Report, described in § 490.107(b)(2)(ii)(A) as the baseline condition/performance. State DOTs may also adjust their 4-year targets, as appropriate.

(8) *Urbanized area specific targets.* The following requirements apply to establishing targets for the CMAQ Traffic Congestion measures in paragraph (c)(7) of this section, as their target scope provided in paragraph (d)(2) of this section:

(i) For the performance period that begins on January 1, 2018, State DOTs, with mainline highways on the NHS that cross any part of an urbanized area with a population more than 1 million within its geographic State boundary and that urbanized area contains any part of a nonattainment or maintenance area for any one of the criteria pollutants, as specified in § 490.703, shall establish targets for the CMAQ Traffic Congestion measures specified in § 490.707(a) and (b).

(ii) Beginning with the performance period that begins on January 1, 2022, and all subsequent performance periods thereafter, State DOTs, with mainline highways on the NHS that cross any part of an urbanized area with a population more than 200,000 within its geographic State boundary and that urbanized area contains any part of a nonattainment or maintenance area for any one of the criteria pollutants, as specified in § 490.703, shall establish targets for the CMAQ Traffic Congestion measures specified in § 490.707(a) and (b).

(iii) If required to establish targets for the CMAQ Traffic Congestion measures,

as described in paragraphs (e)(8)(i) and/or (ii) of this section, State DOTs shall comply with the following:

(A) For each urbanized area, only one 2-year target and one 4-year target for the entire urbanized area shall be established regardless of roadway ownership.

(B) For each urbanized area, all State DOTs and MPOs that contain, within their respective boundaries, any portion of the NHS network in that urbanized area shall agree on one 2-year and one 4-year target for that urbanized area. In accordance with paragraphs (e)(5) and (f)(9) of this section, the targets reported by the State DOTs and MPOs for that urbanized area shall be identical.

(C) Except as provided in paragraphs (e)(8)(iii)(F) and (e)(8)(v) of this section, State DOTs shall meet all reporting requirements in § 490.107 for the entire performance period even if there is a change of population, NHS designation, or nonattainment/maintenance area designation during that performance period.

(D) The 1 million and 200,000 population thresholds, in paragraphs (e)(8)(i) and (ii) of this section, shall be determined based on the most recent annual population estimates published by the U.S. Census available 1 year before when the State DOT Baseline Performance Period Report is due to FHWA.

(E) NHS designations and urbanized areas, in paragraphs (e)(8)(i) and (ii) of this section, shall be determined from the data, contained in HPMS, 1 year before when the State DOT Baseline Performance Period Report is due to FHWA.

(F) The designation of nonattainment or maintenance areas, in paragraphs (e)(8)(i) and (ii) of this section, shall be determined based on the effective date of U.S. EPA's designation under the NAAQS in 40 CFR part 81, as of the date 1 year before the State DOT Baseline Performance Period Report is due to FHWA. The nonattainment and maintenance areas shall be revised if, on the date 1 year before the State DOT Mid Performance Period Progress Report in § 490.107(b)(2)(ii) is due to FHWA, the area is no longer in nonattainment or maintenance for a criteria pollutant included in § 490.703.

(iv) If a State DOT does not meet the criteria specified in paragraph (e)(8)(i) or (ii) of this section 1 year before when the State DOT Baseline Performance Period Report is due to FHWA, then that State DOT is not required to establish targets for the CMAQ Traffic Congestion measures for that performance period.

(v) If the urbanized area, in paragraph (e)(8)(i) or (ii) of this section, does not

contain any part of a nonattainment or maintenance area for the applicable criteria pollutants, as specified in § 490.703, 1 year before the State DOT Mid Performance Period Progress Report is due to FHWA, as described in paragraph (e)(8)(iii)(F) of this section, then that State DOT is not required to meet the requirements in § 490.107 for the CMAQ Traffic Congestion measures for that urbanized area for the remainder of that performance period.

(vi) The following requirements apply only the Peak Hour Excessive Delay (PHED) measure in § 490.707(a) to assess CMAQ Traffic Congestion in to the first performance period:

(A) State DOTs shall establish their 4-year targets, required under paragraph (e)(4)(iv) of this section, and report these targets in their Baseline Performance Period Report, required under § 490.107(b)(1).

(B) State DOTs shall not report 2-year targets, described in paragraph (e)(4)(ii) of this section, and baseline condition/performance in their Baseline Performance Period Report.

(C) State DOTs shall use the 2-year condition/performance in their Mid Performance Period Progress Report, described in § 490.107(b)(2)(ii)(A) as the baseline condition/performance. The established baseline condition/performance shall be collectively developed and agreed upon with relevant MPOs.

(D) State DOTs may, as appropriate, adjust their 4-year target(s) in their Mid Performance Period Progress Report, described in § 490.107(b)(2)(ii)(A). Adjusted 4-year target(s) shall be developed and collectively agreed upon with relevant MPO(s), as described in paragraph (e)(6) of this section.

(E) State DOTs shall annually report metrics for all mainline highways on the NHS for all applicable urbanized area(s) throughout the performance period, as required in § 490.711(f).

(9) *Targets for Total Emissions Reduction measure.* The following requirements apply to establishing targets for the measures specified in paragraph (c)(8) of this section:

(i) The State DOTs shall establish statewide targets for the Total Emissions Reduction measure for all nonattainment and maintenance areas for all applicable criteria pollutants and precursors specified in § 490.803.

(ii) For all nonattainment and maintenance areas within the State geographic boundary, the State DOT shall establish separate statewide targets for each of the applicable criteria pollutants and precursors specified in § 490.803.

(iii) The established targets, as specified in paragraph (e)(4) of this section, shall reflect the anticipated cumulative emissions reduction to be reported in the CMAQ Public Access System required in § 490.809(a).

(iv) In addition to the statewide targets in paragraph (e)(9)(i) of this section, State DOTs may, as appropriate, establish additional targets for any number and combination of nonattainment and maintenance areas by applicable criteria pollutant within the geographic boundary of the State. If a State DOT establishes additional targets for nonattainment and maintenance areas, it shall report the targets in the Baseline Performance Period Report required by § 490.107(b)(1). State DOTs shall evaluate separately the progress of each of these additional targets and report that progress as required under § 490.107(b)(2)(ii)(B) and (b)(3)(ii)(B).

(v) The designation of nonattainment or maintenance areas shall be determined based on the effective date of U.S. EPA's designation under the NAAQS in 40 CFR part 81, as of the date 1 year before the State DOT Baseline Performance Period Report is due to FHWA. The nonattainment and maintenance areas shall be revised if, on the date 1 year before the State DOT Mid Performance Period Progress Report in § 490.107(b)(2)(ii) is due to FHWA, the area is no longer in nonattainment or maintenance for a criteria pollutant included in § 490.803.

(vi) Except as provided in paragraphs (e)(9)(vii) and (viii) of this section, the State DOT shall meet all reporting requirements in § 490.107 for the entire performance period even if there is a change of nonattainment or maintenance area during that performance period.

(vii) If a State geographic boundary does not contain any part of nonattainment or maintenance areas for applicable criteria pollutants and precursors, as specified in § 490.803, 1 year before the State DOT Baseline Performance Period Report is due to FHWA, then that State DOT is not required to establish targets for Total Emissions Reduction measures for that performance period.

(viii) If the State geographic boundary, in paragraph (e)(9)(ii) of this section, does not contain any part of the nonattainment or maintenance area for an applicable criteria pollutant or precursor, as specified in § 490.803, 1 year before the State DOT Mid Performance Period Progress Report is due to FHWA as described in paragraph (e)(9)(v) of this section, then that State DOT is not required to meet the

requirements in § 490.107 for the Total Emissions Reduction measure for that applicable criteria pollutant or precursor for the remainder of that performance period.

(f) *MPO establishment.* The MPOs shall establish targets for each of the performance measures identified in paragraph (c) of this section for the respective target scope identified in paragraph (d) of this section as follows:

(1) *Schedule.* The MPOs shall establish targets no later than 180 days after the respective State DOT(s) establishes their targets, as provided in paragraph (e)(1) of this section.

(i) The MPOs shall establish 4-year targets, described in paragraph (e)(4)(iv) of this section, for all applicable measures, described in paragraphs (c) and (d) of this section.

(ii) Except as provided in paragraph (f)(5)(vi) of this section, the MPOs shall establish 2-year targets, described in paragraph (e)(4)(iii) of this section for the CMAQ Traffic Congestion and Total Emissions Reduction measures, described in paragraphs (c) and (d) of this section as their applicability criteria described in paragraphs (f)(5)(i) and (ii) and (f)(6)(iii) of this section, respectively.

(iii) If an MPO does not meet the criteria described in paragraph (f)(5)(i), (f)(5)(ii), or (f)(6)(iii) of this section, the MPO is not required to establish 2-year target(s) for the corresponding measure(s).

(2) *Coordination.* The MPOs shall coordinate with relevant State DOT(s) on the selection of targets in accordance with 23 U.S.C. 134(h)(2)(B)(i)(II) to ensure consistency, to the maximum extent practicable.

(3) *Target establishment options.* For each performance measure identified in paragraph (c) of this section, except the CMAQ Traffic Congestion measures in paragraph (f)(5) of this section, and MPOs meeting the criteria under paragraph (f)(6)(iii) of this section for Total Emissions Reduction measure, the MPOs shall establish targets by either:

(i) Agreeing to plan and program projects so that they contribute toward the accomplishment of the relevant State DOT target for that performance measure; or

(ii) Committing to a quantifiable target for that performance measure for their metropolitan planning area.

(4) *MPOs serving a multistate planning area.* Except as provided in the CMAQ Traffic Congestion measures in paragraph (f)(5) of this section, and MPOs meeting the criteria under paragraph (f)(6)(iii) of this section, for Total Emissions Reduction measure, MPOs with planning areas extending



across State boundaries shall follow these requirements for each performance measure identified in paragraph (c) of this section:

(i) For each measure, MPOs may choose different target establishment options, provided in paragraph (f)(3) of this section, for the portion of the planning area within each State.

(ii) If MPOs choose the option to agree to plan and program projects to contribute toward State DOT targets, in accordance with paragraph (f)(3)(i) of this section, for a measure, then they shall plan and program projects in support of State DOT targets for the portion of the planning area within each State.

(5) *Urbanized area specific targets.* The following requirements apply to establishing targets for the CMAQ Traffic Congestion measures in paragraph (c)(7) of this section, as their target scope provided in paragraph (d)(2) of this section:

(i) For the performance period that begins on January 1, 2018, MPOs shall establish targets for the CMAQ Traffic Congestion measures specified in § 490.707(a) and (b) when mainline highways on the NHS within their metropolitan planning area boundary cross any part of an urbanized area with a population more than 1 million, and that portion of their metropolitan planning area boundary also contains any portion of a nonattainment or maintenance area for any one of the criteria pollutants, as specified in § 490.703. If an MPO with mainline highways on the NHS within their metropolitan planning area boundary cross any part of an urbanized area with a population more than 1 million and that urbanized area contains any part of a nonattainment or maintenance area, for any one of the criteria pollutant as specified in § 490.703, outside of its metropolitan planning area boundary, then that MPO should coordinate with relevant State DOT(s) and MPO(s) in the target establishment process for the CMAQ Traffic Congestion measures specified in § 490.707.

(ii) Beginning with the performance period that begins on January 1, 2022, and all subsequent performance periods thereafter, MPOs shall establish targets for the CMAQ Traffic Congestion measures specified in § 490.707(a) and (b) when mainline highways on the NHS within their metropolitan planning area boundary cross any part of an urbanized area with a population more than 200,000, and that portion of their metropolitan planning area boundary also contains any portion of a nonattainment or maintenance area for any one of the criteria pollutants, as

specified in § 490.703. If an MPO with mainline highways on the NHS within their metropolitan planning area boundary cross any part of an urbanized area with a population more than 200,000 and that urbanized area contains any part of a nonattainment or maintenance area, for any one of the criteria pollutant as specified in § 490.703, outside of its metropolitan planning area boundary, then that MPO should coordinate with relevant State DOT(s) and MPO(s) in the target establishment process for the CMAQ Traffic Congestion measures specified in § 490.707.

(iii) If required to establish a target for the CMAQ Traffic Congestion measures, as described in paragraphs (f)(5)(i) and/or (ii) of this section, MPOs shall comply with the following:

(A) For each urbanized area, only one 2-year target and one 4-year target for the entire urbanized area shall be established regardless of roadway ownership.

(B) For each urbanized area, all State DOTs and MPOs that contain, within their respective boundaries, any portion of the NHS network in that urbanized area shall agree on one 2-year and one 4-year target for that urbanized area. The targets reported, in accordance with paragraphs (e)(5) and (f)(9) of this section, by the State DOTs and MPOs for that urbanized area shall be identical.

(C) Except as provided in paragraphs (f)(5)(iii)(F) and (f)(5)(v) of this section, MPOs shall meet all reporting requirements in § 490.107(c) for the entire performance period even if there is a change of population, NHS designation, or nonattainment/maintenance area during that performance period.

(D) The 1 million and 200,000 population thresholds, in paragraph (f)(5)(i) and (ii) of this section, shall be determined based on the most recent annual population estimates published by the U.S. Census available 1 year before the State DOT Baseline Performance Period Report is due to FHWA.

(E) NHS designations and urbanized areas, in paragraphs (f)(5)(i) and (ii) of this section, shall be determined from the data, contained in HPMS, 1 year before State DOT Baseline Performance Period Report is due to FHWA.

(F) The designation of nonattainment or maintenance areas, in paragraph (f)(5)(i) and (ii) of this section, shall be determined based on the effective date of U.S. EPA's designation under the NAAQS in 40 CFR part 81, as of the date 1 year before the State DOT Baseline Performance Period Report is due to

FHWA. The nonattainment and maintenance areas shall be revised if, on the date 1 year before the State DOT Mid Performance Period Progress Report in § 490.107(b)(2)(ii) is due to FHWA, the area is no longer in nonattainment or maintenance for a criteria pollutant included in § 490.703.

(iv) If an MPO does not meet the criteria specified in paragraph (f)(5)(i) or (ii) of this section at the time that is 1 year before when the State DOT Baseline Performance Period Report is due to FHWA, then that MPO is not required to establish targets for the CMAQ Traffic Congestion measure for that performance period.

(v) If the portion of the metropolitan planning area boundary within the urbanized area, in paragraph (f)(5)(i) or (ii) of this section, does not contain any part of a nonattainment or maintenance area for the applicable criteria pollutants, as specified in § 490.703, at the time that is 1 year before when the State DOT Mid Performance Period Progress Report is due to FHWA, as described in paragraph (f)(5)(iii)(F) of this section, then that MPO is not required to meet the requirements in § 490.107 for the CMAQ Traffic Congestion measures for that urbanized area for the remainder of that performance period.

(vi) The following requirements apply only to the first performance period and the PHED measure to assess traffic congestion in § 490.707(a):

(A) The MPOs shall not report 2-year targets, described in paragraph (f)(5)(iii)(A) of this section;

(B) The MPOs shall use the 2-year condition/performance in the State DOT Mid Performance Period Progress Report, described in § 490.107(b)(2)(ii)(A) as baseline condition/performance. The established baseline condition/performance shall be agreed upon and made collectively with relevant State DOTs; and

(C) The MPOs may, as appropriate, adjust their 4-year target(s). Adjusted 4-year target(s) shall be collectively developed and agreed upon with all relevant State DOT(s), as described in paragraph (f)(8) of this section.

(6) *Targets for the Total Emissions Reduction measure.* The following requirements apply to establishing targets for the measure in paragraph (c)(8) of this section:

(i) The MPO shall establish targets for each of the applicable criteria pollutants and precursors, specified in § 490.803, for which it is in nonattainment or maintenance, within its metropolitan planning area boundary.

(ii) The established targets, as specified in paragraph (e)(4) of this



section, shall reflect the anticipated cumulative emissions reduction to be reported in the CMAQ Public Access System required in § 490.809(a).

(iii) If any part of a designated nonattainment and maintenance area within the metropolitan planning area overlaps the boundary of an urbanized area with a population more than 1 million in population, as of 1 year before the State DOT Baseline Performance Period Report is due to FHWA, then that MPO shall establish both 2-year and 4-year targets for their metropolitan planning area. The population threshold shall be determined based on the most recent annual population estimates published by the U.S. Census available 1 year before the State DOT Baseline Performance Period Report is due to FHWA.

(iv) For the nonattainment and maintenance areas within the metropolitan planning area that do not meet the criteria in paragraph (f)(6)(iii) of this section, MPOs shall establish 4-year targets for their metropolitan planning area, as described in paragraph (f)(3) of this section.

(v) The designation of nonattainment or maintenance areas shall be determined based on the effective date of U.S. EPA's designation under the NAAQS in 40 CFR part 81, as of the date 1 year before the State DOT Baseline Performance Period Report is due to FHWA. The nonattainment and maintenance areas shall be revised if, on the date 1 year before the State DOT Mid Performance Period Progress Report in § 490.107(b)(2)(ii) is due to FHWA, the area is no longer in nonattainment or maintenance for a criteria pollutant included in § 490.803.

(vi) Except as provided in paragraphs (f)(6)(v) and (viii) of this section, MPOs shall meet all reporting requirements in § 490.107(c) for the entire performance period even if there is a change of nonattainment or maintenance area or population during that performance period.

(vii) If a metropolitan planning area boundary does not contain any part of nonattainment or maintenance areas for applicable criteria pollutants 1 year before when the State DOT Baseline Performance Period Report is due to FHWA, then that MPO is not required to establish targets for the Total Emissions Reduction measure for that performance period.

(viii) If the metropolitan planning area boundary, in paragraph (f)(6)(i) of this section, does not contain any part of a nonattainment or maintenance area for the applicable criteria pollutants, as specified in § 490.803, 1 year before the

State DOT Mid Performance Period Progress Report is due to FHWA, as described in paragraph (f)(6)(v) of this section, then that MPO is not required to meet the requirements in § 490.107 for the Total Emissions Reduction measure for that applicable criteria pollutant or precursor for the remainder of that performance period.

(7) *MPO response to State DOT target adjustment.* For the established targets in paragraph (f)(3) of this section, if the State DOT adjusts a 4-year target in the State DOT's Mid Performance Period Progress Report and if, for that respective target, the MPO established a target by supporting the State DOT target as allowed under paragraph (f)(3)(i) of this section, then the MPO shall, within 180 days, report to the State DOT whether it will either:

(i) Agree to plan a program of projects so that they contribute to the adjusted State DOT target for that performance measure; or

(ii) Commit to a new quantifiable target for that performance measure for its metropolitan planning area.

(8) *Target adjustment.* If the MPO establishes its target by committing to a quantifiable target, described in paragraph (f)(3)(ii) of this section or establishes target(s) for the Total Emissions Reduction measure required in paragraph (f)(6)(iii) of this section, then the MPOs may adjust its target(s) in a manner that is collectively developed, documented, and mutually agreed upon by the State DOT and MPO. Any adjustments made to 4-year targets, established for CMAQ Traffic Congestion measures in paragraph (f)(5)(i) or (ii) of this section, shall be collectively developed and agreed upon by all State DOTs and MPOs that include any portion of the NHS in the respective urbanized area applicable to the measure.

(9) *Reporting.* The MPOs shall report targets and progress toward the achievement of their targets as specified in § 490.107(c). After the MPOs establish or adjust their targets, the relevant State DOT(s) must be able to provide these targets to FHWA upon request.

#### **§ 490.107 Reporting on performance targets.**

(a) *In general.* All State DOTs and MPOs shall report the information specified in this section for the targets required in § 490.105.

(1) All State DOTs and MPOs shall report in accordance with the schedule and content requirements under paragraphs (b) and (c) of this section, respectively.

(2) For the measures identified in § 490.207(a), all State DOTs and MPO shall report on performance in accordance with § 490.213.

(3) State DOTs shall report using an electronic template provided by FHWA.

(b) *State Biennial Performance Report.* State DOTs shall report to FHWA baseline condition/performance at the beginning of a performance period and progress achievement at both the midpoint and end of a performance period. State DOTs shall report at an ongoing 2-year frequency as specified in paragraphs (b)(1) through (3) of this section.

(1) *Baseline Performance Period Report—(i) Schedule.* State DOTs shall submit a Baseline Performance Period Report to FHWA by October 1st of the first year in a performance period. State DOTs shall submit their first Baseline Performance Period Report to FHWA by October 1, 2018, and subsequent Baseline Performance Period Reports to FHWA by October 1st every 4 years thereafter.

(ii) *Content.* The State DOT shall report the following information in each Baseline Performance Period Report:

(A) *Targets.* 2-year and 4-year targets for the performance period, as required in § 490.105(e), and a discussion, to the maximum extent practicable, of the basis for each established target;

(B) *Baseline condition/performance.* Baseline condition/performance derived from the latest data collected through the beginning date of the performance period specified in § 490.105(e)(4)(i) for each target, required under paragraph (b)(1)(ii)(A) of this section;

(C) *Relationship with other performance expectations.* A discussion, to the maximum extent practicable, on how the established targets in paragraph (b)(1)(ii)(A) of this section support expectations documented in longer range plans, such as the State asset management plan required by 23 U.S.C. 119(e) and the long-range statewide transportation plan provided in part 450 of this chapter;

(D) *Urbanized area boundaries and population data for targets.* For the purpose of establishing additional targets for urbanized and non-urbanized areas in § 490.105(e)(3) and the urbanized area specific targets in § 490.105(e)(8), State DOTs shall document the boundary extent for all applicable urbanized areas based on information in HPMS;

(E) *Congestion at truck freight bottlenecks.* The State DOT shall document the location of truck freight bottlenecks within the State, including those identified in the National Freight Strategic Plan. If a State has prepared a

State Freight Plan under 49 U.S.C. 70202, within the last 2 years, then the State Freight Plan may serve as the basis for identifying truck freight bottlenecks;

(F) *Nonattainment and maintenance area for targets.* Where applicable, for the purpose of determining target scope in § 490.105(d) and any additional targets under § 490.105(e)(9)(iv), State DOTs shall describe the boundaries of U.S. EPA's designated nonattainment and maintenance areas, as described in §§ 490.103(c) and 490.105(e)(9)(v);

(G) *MPO CMAQ Performance Plan.* Where applicable, State DOTs shall include as an attachment the MPO CMAQ Performance Plan, described in paragraph (c)(3) of this section;

(H) *GHG metrics for the GHG measure.* Total tailpipe CO<sub>2</sub> emissions for the calendar year 2017, as described in § 490.511(f)(1) and total tailpipe CO<sub>2</sub> emissions for the 2 preceding calendar years of the year in which Baseline Performance Period Report is due to FHWA, as described in § 490.511(f)(2) for the GHG measure in § 490.507(b); and

(I) *Data collection method for the Percent of Non-SOV Travel measure.* Where applicable, State DOTs shall report the data collection method that is used to determine the Percent of Non-SOV Travel measure, in § 490.707(b), for each applicable urbanized area in the State, as provided in § 490.709(f)(2).

(2) *Mid Performance Period Progress Report—(i) Schedule.* State DOTs shall submit a Mid Performance Period Progress Report to FHWA by October 1st of the third year in a performance period. State DOTs shall submit their first Mid Performance Period Progress Report to FHWA by October 1, 2020, and subsequent Mid Performance Period Progress Reports to FHWA by October 1st every 4 years thereafter.

(ii) *Content.* The State DOT shall report the following information in each Mid Performance Period Progress Report:

(A) *2-year condition/performance.* The actual condition/performance derived from the latest data collected through the midpoint of the performance period, specified in § 490.105(e)(4), for each State DOT reported target required in paragraph (b)(1)(ii)(A) of this section;

(B) *2-year progress in achieving performance targets.* A discussion of the State DOT's progress toward achieving each established 2-year target in paragraph (b)(1)(ii)(A) of this section. The State DOT shall compare the actual 2-year condition/performance in paragraph (b)(2)(ii)(A) of this section, within the boundaries and limits documented in paragraphs (b)(1)(ii)(D)

and (E) of this section, with the respective 2-year target and document in the discussion any reasons for differences in the actual and target values;

(C) *Investment strategy discussion.* A discussion on the effectiveness of the investment strategies developed and documented in the State asset management plan for the NHS required under 23 U.S.C. 119(e);

(D) *Congestion at truck freight bottlenecks.* Discussion on progress of the State DOT's efforts in addressing congestion at truck freight bottlenecks within the State, as described in paragraph (b)(1)(ii)(F) of this section, through comprehensive freight improvement efforts of State Freight Plan or MPO freight plans; the Statewide Transportation Improvement Program and Transportation Improvement Program; regional or corridor level efforts; other related planning efforts; and operational and capital activities targeted to improve freight movement on the Interstate System. If a State has prepared a State Freight Plan under 49 U.S.C. 70202 within the previous 2 years, then the State Freight Plan may serve as the basis for addressing congestion at truck freight bottlenecks. If the State Freight Plan has not been updated since the previous State Biennial Performance Report, then an updated analysis of congestion at truck freight bottlenecks must be completed;

(E) *Target adjustment discussion.* When applicable, a State DOT may submit an adjusted 4-year target to replace an established 4-year target in paragraph (b)(1)(ii)(A) of this section. If the State DOT adjusts its target, it shall include a discussion on the basis for the adjustment and how the adjusted target supports expectations documented in longer range plans, such as the State asset management plan and the longer range statewide transportation plan. The State DOT may only adjust a 4-year target at the midpoint and by reporting the change in the Mid Performance Period Progress Report;

(F) *2-year significant progress discussion for the National Highway Performance Program (NHPP) targets and the National Highway Freight Program (NHFP) target.* State DOTs shall discuss the progress they have made toward the achievement of all 2-year targets established for the NHPP measures in § 490.105(c)(1) through (5) and the Freight Reliability measure in § 490.105(c)(6). This discussion should document a summary of prior accomplishments and planned activities that will be conducted during the remainder of the performance period to

make significant progress toward that achievement of 4-year targets for applicable measures;

(G) *Extenuating circumstances discussion on 2-year Targets.* When applicable, for 2-year targets for the NHPP or NHFP, a State DOT may include a discussion on the extenuating circumstance(s), described in § 490.109(e)(5), beyond the State DOT's control that prevented the State DOT from making 2-year significant progress toward achieving NHPP or NHFP target(s) in paragraph (b)(2)(ii)(F) of this section;

(H) *Applicable target achievement discussion.* If FHWA determined that a State DOT has not made significant progress toward the achievement of any 4-year NHPP or NHFP targets in the FHWA determination made after the State DOT submits the Full Performance Period Progress Report for the immediate prior performance period, then the State DOT shall include a description of the actions they will undertake to better achieve those targets as required under § 490.109(f). If FHWA determined under § 490.109(e) that the State DOT has made significant progress for immediate prior performance period's 4-year NHPP or NHFP targets, then the State DOT does not need to include this description for those targets;

(I) *MPO CMAQ Performance Plan.* Where applicable, State DOTs shall include as an attachment the MPO CMAQ Performance Plan, described in paragraph (c)(3) of this section; and

(J) *GHG metrics for the GHG measure.* Total tailpipe CO<sub>2</sub> emissions for 2 preceding calendar years of the year in which the Mid Performance Period Progress Report is due to FHWA, as described in § 490.511(f)(2), for the GHG measure in § 490.507(b).

(3) *Full Performance Period Progress Report—(i) Schedule.* State DOTs shall submit a progress report on the full performance period to FHWA by October 1st of the first year following the reference performance period. State DOTs shall submit their first Full Performance Period Progress Report to FHWA by October 1, 2022, and subsequent Full Performance Period Progress Reports to FHWA by October 1st every 4 years thereafter.

(ii) *Content.* The State DOT shall report the following information for each Full Performance Period Progress Report:

(A) *4-year condition/performance.* The actual condition/performance derived from the latest data collected through the end of the performance period, specified in § 490.105(e)(4), for



each State DOT reported target required in paragraph (b)(1)(ii)(A) of this section;

(B) *4-year progress in achieving performance targets.* A discussion of the State DOT's progress made toward achieving each established 4-year target in paragraph (b)(1)(ii)(A) or (b)(2)(ii)(E) of this section, when applicable. The State DOT shall compare the actual 4-year condition/performance in paragraph (b)(3)(ii)(A) of this section, within the boundaries and limits documented in paragraphs (b)(1)(ii)(D) and (E) of this section, with the respective 4-year target and document in the discussion any reasons for differences in the actual and target values;

(C) *Investment strategy discussion.* A discussion on the effectiveness of the investment strategies developed and documented in the State asset management plan for the NHS required under 23 U.S.C. 119(e);

(D) *Congestion at truck freight bottlenecks.* Discussion on progress of the State DOT's efforts in addressing congestion at truck freight bottlenecks within the State, as described in paragraphs (b)(1)(ii)(F) and (b)(2)(ii)(D) of this section;

(E) *4-year significant progress evaluation for applicable targets.* State DOTs shall discuss the progress they have made toward the achievement of all 4-year targets established for the NHPP measures in § 490.105(c)(1) through (5) and the Freight Reliability measure in § 490.105(c)(6). This discussion shall include a summary of accomplishments achieved during the performance period to demonstrate whether the State DOT has made significant progress toward achievement of 4-year targets for those measures;

(F) *Extenuating circumstances discussion on applicable targets.* When applicable, a State DOT may include discussion on the extenuating circumstance(s), described in § 490.109(e)(5), beyond the State DOT's control that prevented the State DOT from making a 4-year significant progress toward achieving NHPP or NHFP targets, described in paragraph (b)(3)(ii)(E) of this section;

(G) *Applicable target achievement discussion.* If FHWA determined that a State DOT has not made significant progress toward the achievement of any 2-year NHPP or NHFP targets in the biennial FHWA determination made after the State DOT submits the Mid Performance Period Progress Report for the performance period, then the State DOT shall include a description of the actions they will undertake to better achieve those targets as required under § 490.109(f). If FHWA determined in

§ 490.109(e) that the State DOT has made significant progress for the 2-year NHPP or NHFP targets for the performance period, then the State DOT does not need to include this description for those targets;

(H) *MPO CMAQ Performance Plan.*

Where applicable, State DOTs shall include as an attachment the MPO CMAQ Performance Plan, described in paragraph (c)(3) of this section; and

(I) *GHG metrics for the GHG measure.* Total tailpipe CO<sub>2</sub> emissions for 2 preceding calendar years of the year in which the Full Performance Period Progress Report is due to FHWA, as described in § 490.511(f)(2), for the GHG measure in § 490.507(b).

(c) *MPO Report.* The MPOs shall establish targets in accordance with § 490.105 and report targets and progress toward the achievement of their targets in a manner that is consistent with the following:

(1) The MPOs shall report their established targets to their respective State DOT in a manner that is documented and mutually agreed upon by both parties.

(2) The MPOs shall report baseline condition/performance and progress toward the achievement of their targets in the system performance report in the metropolitan transportation plan in accordance with part 450 of this chapter.

(3) The MPOs serving a TMA and meeting criteria, specified in § 490.105(f)(6)(iii), shall develop a CMAQ performance plan as required by 23 U.S.C. 149(l). The CMAQ performance plan is not required when the MPO meets the criteria specified in § 490.105(f)(6)(vii) or (viii).

(i) The CMAQ performance plan shall be submitted to FHWA by the State DOT, and be updated biennially on the same schedule as the State Biennial Performance Reports.

(ii) For the CMAQ Traffic Congestion and Total Emissions Reduction measures in subparts G and H of this part, the CMAQ performance plan submitted with the State DOT's Baseline Performance Period Report to FHWA shall include:

(A) The 2-year and 4-year targets for the CMAQ Traffic Congestion measures, identical to the relevant State DOT(s) reported target under paragraph (b)(1)(ii)(A) of this section, for each applicable urbanized area;

(B) The 2-year and 4-year targets for the Total Emissions Reduction measure for the performance period;

(C) Baseline condition/performance for each MPO reported CMAQ Traffic Congestion targets, identical to the relevant State DOT(s) reported baseline

condition/performance under paragraph (b)(1)(ii)(B) of this section;

(D) Baseline condition/performance derived from the latest estimated cumulative emissions reductions from CMAQ projects for each MPO reported Total Emissions Reduction target; and

(E) A description of projects identified for CMAQ funding and how such projects will contribute to achieving the performance targets for these measures.

(iii) For the CMAQ Traffic Congestion and Total Emissions Reduction measures in subparts G and H of this part, the CMAQ performance plan submitted with the State DOT's Mid Performance Period Progress Report to FHWA shall include:

(A) 2-year condition/performance for the CMAQ Traffic Congestion measures, identical to the relevant State DOT(s) reported condition/performance under paragraph (b)(2)(ii)(A) of this section, for each applicable urbanized area;

(B) 2-year condition/performance derived from the latest estimated cumulative emissions reductions from CMAQ projects for each MPO reported Total Emissions Reduction target;

(C) An assessment of the progress of the projects identified in the CMAQ performance plan submitted with the Baseline Performance Period Report toward achieving the 2-year targets for these measures;

(D) When applicable, an adjusted 4-year target to replace an established 4-year target; and

(E) An update to the description of projects identified for CMAQ funding and how those updates will contribute to achieving the 4-year performance targets for these measures.

(iv) For the CMAQ Traffic Congestion and Total Emissions Reduction measures in subparts G and H of this part, the CMAQ performance plan submitted with the State DOT's Full Performance Period Progress Report to FHWA shall include:

(A) 4-year condition/performance for the CMAQ Traffic Congestion measures, identical to the relevant State DOT(s) reported condition/performance reported under paragraph (b)(3)(ii)(A) of this section, for each applicable urbanized area;

(B) 4-year condition/performance derived from the latest estimated cumulative emissions reductions from CMAQ projects for each MPO reported Total Emissions Reduction target; and

(C) An assessment of the progress of the projects identified in both paragraphs (c)(3)(ii)(C) and (c)(3)(iii)(D) of this section toward achieving the 4-year targets for these measures.

(4) If an MPO elected to establish a quantifiable target, as provided in



§ 490.105(f)(3)(ii), for the GHG measure in § 490.507(b), then that MPO shall report a description of its measure calculation method to its State DOT in a manner that is documented and mutually agreed upon by both the State DOT and the MPO.

**§ 490.109 Assessing significant progress toward achieving the performance targets for the National Highway Performance Program and the National Highway Freight Program.**

(a) *In general.* The FHWA will assess each of the State DOT targets separately for the NHPP measures specified in § 490.105(c)(1) through (5) and the Freight Reliability measure specified in § 490.105(c)(6) to determine the significant progress made toward the achievement of those targets.

(b) *Frequency.* The FHWA will determine whether a State DOT has or has not made significant progress toward the achievement of applicable targets as described in paragraph (e) of this section at the midpoint and the end of each performance period.

(c) *Schedule.* The FHWA will determine significant progress toward the achievement of a State DOT's NHPP and NHFP targets after the State DOT submits the Mid Performance Period Progress Report for progress toward the achievement of 2-year targets, and again after the State DOT submits the Full Performance Period Progress Report for progress toward the achievement of 4-year targets. The FHWA will notify State DOTs of the outcome of the determination of the State DOT's ability to make significant progress toward the achievement of its NHPP and NHFP targets.

(d) *Source of data/information.* (1) The FHWA will use the following sources of information to assess NHPP target achievement and condition/performance progress:

(i) Data contained within the HPMS on June 15th of the year in which the significant progress determination is made that represents conditions from the prior year for targets established for Interstate System pavement condition measures, as specified in § 490.105(c)(1);

(ii) Data contained within the HPMS on August 15th of the year in which the significant progress determination is made that represents conditions from the prior year for targets established for non-Interstate NHS pavement condition measures, as specified in § 490.105(c)(2);

(iii) The most recently available data contained within the NBI as of June 15th of the year in which the significant progress determination is made for

targets established for NHS bridge condition measures, as specified in § 490.105(c)(3);

(iv) Data contained within the HPMS on August 15th of the year in which the significant progress determination is made that represents performance from the prior year for targets established for the Travel Time Reliability measures, as specified in § 490.105(c)(4);

(v) On October 1st of the year in which the significant progress determination is made, the reported total tailpipe CO<sub>2</sub> emissions for the calendar year 2017 in the Baseline Performance Period Report, as described in § 490.107(b)(1)(ii)(I), and the reported total tailpipe CO<sub>2</sub> emissions in the State Biennial Performance Report, as described in § 490.107(b)(2)(ii)(J) or (b)(3)(ii)(I), in the year in which the significant progress determination is made for GHG measure in § 490.105(c)(5); and

(vi) Baseline condition/performance data contained in HPMS and NBI of the year in which the Baseline Period Performance Report is due to FHWA that represents baseline conditions/performances for the performance period for the measures in § 490.105(c)(1) through (4), and the HPMS data reported in the year in which Baseline Period Performance Report is due to FHWA and the total tailpipe CO<sub>2</sub> emissions reported in the Baseline Period Performance Report, as provided in § 490.107(b)(1)(ii)(I), for the GHG measure in § 490.105(c)(5).

(2) The FHWA will use the following sources of information to assess NHFP target achievement and condition/performance progress:

(i) Data contained within the HPMS on August 15th of the year in which the significant progress determination is made that represents performance from the prior year for targets established for the Freight Reliability measure, as specified in § 490.105(c)(6); and

(ii) Baseline condition/performance data contained in HPMS of the year in which the Baseline Period Performance Report is due to FHWA that represents baseline condition/performance for the performance period.

(e) *Significant progress determination for individual NHPP and NHFP targets—*(1) *In general.* The FHWA will biennially assess whether the State DOT has achieved or made significant progress toward each target established by the State DOT for the NHPP measures described in § 490.105(c)(1) through (5) and the Freight Reliability measure described in § 490.105(c)(6). The FHWA will assess the significant progress of each statewide target separately using the condition/

performance data/information sources described in paragraph (d) of this section. The FHWA will not assess the progress achieved for any additional targets a State DOT may establish under § 490.105(e)(3).

(2) *Significant progress toward individual NHPP and NHFP targets.* The FHWA will determine that a State DOT has made significant progress toward the achievement of each 2-year or 4-year applicable target if either:

(i) The actual condition/performance level is better than the baseline condition/performance; or

(ii) The actual condition/performance level is equal to or better than the established target.

(3) *Phase-in of new requirements.* The following requirements shall only apply to the first performance period and only to the Interstate System pavement condition targets and non-Interstate NHS Travel Time Reliability targets, described in § 490.105(e)(7):

(i) At the midpoint of the first performance period, FHWA will not make a determination of significant progress toward the achievement of 2-year targets for Interstate System pavement condition measures:

(ii) The FHWA will classify the assessment of progress toward the achievement of targets in paragraph (e)(3)(i) of this section as "progress not determined" so that they will be excluded from the requirement under paragraph (e)(2) of this section; and

(iii) The FHWA will not make a determination of significant progress toward the achievement of 2-year targets for the Non-Interstate NHS Travel Time Reliability measure.

(4) *Insufficient data and/or information.* The FHWA will determine that a State DOT has not made significant progress toward the achievement of an individual NHPP or NHFP target if:

(i) A State DOT does not submit a required report, individual target, or other information as specified in § 490.107 for the each of the measures in § 490.105(c)(1) through (6);

(ii) The data contained in HPMS do not meet the requirements under § 490.313(b)(4)(i) by the data extraction date specified in paragraph (d)(1) of this section for the each of the Interstate System pavement condition measures in § 490.105(c)(1);

(iii) The data contained in HPMS do not meet the requirements under § 490.313(b)(4)(i) by the data extraction date specified in paragraph (d)(2) of this section for the each of the non-Interstate NHS pavement condition measures in § 490.105(c)(2);

(iv) A State DOT reported data are not cleared in the NBI by the data extraction data specified in paragraph (d)(3) of this section for the each of the NHS bridge condition measures in § 490.105(c)(3); or

(v) The data were determined insufficient, as described in paragraphs (e)(4)(ii) through (iv) of this section, in the year in which the Baseline Period Performance Report is due to FHWA for the measures in § 490.105(c)(1) through (3).

(5) *Extenuating circumstances.* The FHWA will consider extenuating circumstances documented by the State DOT in the assessment of progress toward the achievement of NHPP and NHFP targets in the relevant State Biennial Performance Report, provided in § 490.107.

(i) The FHWA will classify the assessment of progress toward the achievement of an individual 2-year or 4-year target as “progress not determined” if the State DOT has provided an explanation of the extenuating circumstances beyond the control of the State DOT that prevented it from making significant progress toward the achievement of a 2-year or 4-year target and the State DOT has quantified the impacts on the condition/performance that resulted from the circumstances, which are:

(A) Natural or man-made disasters that caused delay in NHPP or NHFP project delivery, extenuating delay in data collection, and/or damage/loss of data system;

(B) Sudden discontinuation of Federal government furnished data due to natural and man-made disasters or sudden discontinuation of Federal government furnished data due to lack of funding; and/or

(C) New law and/or regulation directing State DOTs to change metric and/or measure calculation.

(ii) If the State DOT’s explanation, described in paragraph (e)(5)(i) of this section, is accepted by FHWA, FHWA will classify the progress toward achieving the relevant target(s) as “progress not determined,” and those targets will be excluded from the requirement in paragraph (e)(2) of this section.

(f) *Performance achievement.* (1) If FHWA determines that a State DOT has not made significant progress toward the achieving of NHPP targets, then the State DOT shall include as part of the next performance target report under 23 U.S.C. 150(e) [the Biennial Performance Report] a description of the actions the State DOT will undertake to achieve the targets related to the measure in which

significant progress was not achieved as follows:

(i) If significant progress is not made for either target established for the Interstate System pavement condition measures, § 490.307(a)(1) and (2), then the State DOT shall document the actions it will take to achieve Interstate Pavement condition targets;

(ii) If significant progress is not made for either target established for the Non-Interstate System pavement condition measures, § 490.307(a)(3) and (4), then the State DOT shall document the actions it will take to achieve Non-Interstate Pavement condition target;

(iii) If significant progress is not made for either target established for the NHS bridge condition measures, § 490.407(c)(1) and (2), then the State DOT shall document the actions it will take to achieve NHS bridge condition target;

(iv) If significant progress is not made for either target established for the Travel Time Reliability measures, § 490.507(a)(1) and (2), then the State DOT shall document the actions it will take to achieve the NHS travel time targets; and

(v) If significant progress is not made for the target established for the GHG measure described in § 490.507(b), then the State DOT shall document the actions it will take to achieve the target for the GHG measure.

(2) If FHWA determines that a State DOT has not made significant progress toward achieving the target established for the Freight Reliability measure in § 490.607, then the State DOT shall include as part of the next performance target report under 23 U.S.C. 150(e) [the Biennial Performance Report] the following:

(i) An identification of significant freight system trends, needs, and issues within the State.

(ii) A description of the freight policies and strategies that will guide the freight-related transportation investments of the State.

(iii) An inventory of truck freight bottlenecks within the State and a description of the ways in which the State DOT is allocating funding under title 23 U.S.C. to improve those bottlenecks.

(A) The inventory of truck freight bottlenecks shall include the route and milepost location for each identified bottleneck, roadway section inventory data reported in HPMS, Average Annual Daily Traffic (AADT), Average Annual Daily Truck Traffic (AADTT), Travel-time data and measure of delay, such as travel time reliability, or Average Truck Speeds, capacity feature causing the bottleneck or any other constraints

applicable to trucks, such as geometric constraints, weight limits or steep grades.

(B) For those facilities that are State-owned or operated, the description of the ways in which the State DOT is improving those bottlenecks shall include an identification of methods to address each bottleneck and improvement efforts planned or programed through the State Freight Plan or MPO freight plans; the Statewide Transportation Improvement Program and Transportation Improvement Program; regional or corridor level efforts; other related planning efforts; and operational and capital activities.

(iv) A description of the actions the State DOT will undertake to achieve the target established for the Freight Reliability measure in § 490.607.

(3) The State DOT should, within 6 months of the significant progress determination, amend its Biennial Performance Report to document the information specified in this paragraph to ensure actions are being taken to achieve targets.

#### § 490.111 Incorporation by reference.

(a) Certain material is incorporated by reference into this part with the approval of the Director of the Federal Register under 5 U.S.C. 552(a) and 1 CFR part 51. To enforce any edition other than that specified in this section, FHWA must publish a notice of change in the **Federal Register** and the material must be available to the public. All approved material is available for inspection at the Federal Highway Administration, Office of Highway Policy Information (202–366–4631) 1200 New Jersey Avenue SE., Washington, DC 20590, [www.fhwa.dot.gov](http://www.fhwa.dot.gov) and is available from the sources listed below. It is also available for inspection at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call 202–741–6030 or go to [http://www.archives.gov/federal\\_register/code\\_of\\_federal\\_regulations/ibr\\_locations.html](http://www.archives.gov/federal_register/code_of_federal_regulations/ibr_locations.html).

(b) The Federal Highway Administration, 1200 New Jersey Avenue SE., Washington, DC 20590, [www.fhwa.dot.gov](http://www.fhwa.dot.gov).

(1) Highway Performance Monitoring System (HPMS) Field Manual, IBR approved for §§ 490.103, 490.309, 490.311, and 490.319.

(2) Recording and Coding Guide for the Structure Inventory and Appraisal of the Nation’s Bridges, includes: Errata Sheet for Coding Guide 06/2011, Report No. FHWA–PD–96–001, December



1995, IBR approved for §§ 490.409 and 490.411.

(c) The American Association of State Highway and Transportation Officials, 444 North Capitol Street NW., Suite 249, Washington, DC 20001, (202) 624-5800, [www.transportation.org](http://www.transportation.org).

(1) AASHTO Standard M328-14, Standard Specification for Transportation Materials and Methods of Sampling and Testing, Inertial Profiler, 2014, 34th/2014 Edition, IBR approved for § 490.309.

(2) AASHTO Standard R57-14, Standard Specification for Transportation Materials and Methods of Sampling and Testing, Standard Practice for Operating Inertial Profiling Systems, 2014, 34th/2014 Edition, IBR approved for § 490.309.

(3) AASHTO Standard R48-10 (2013), Standard Specification for Transportation Materials and Methods of Sampling and Testing, Standard Practice for Determining Rut Depth in Pavements, 2014, 34th/2014 Edition, IBR approved for § 490.309.

(4) AASHTO Standard R36-13, Standard Specification for Transportation Materials and Methods of Sampling and Testing, Standard Practice for Evaluating Faulting of Concrete Pavements, 2014, 34th/2014 Edition, IBR approved for § 490.309.

(5) AASHTO Standard R43-13, Standard Specification for Transportation Materials and Methods of Sampling and Testing, Standard Practice for Quantifying Roughness of Pavement, 2014, 34th/2014 Edition, IBR approved for § 490.311.

■ 3. Add subpart E to read as follows:

**Subpart E—National Performance Management Measures To Assess Performance of the National Highway System**

Sec.	
490.501	Purpose.
490.503	Applicability.
490.505	Definitions.
490.507	National performance management measures for system performance.
490.509	Data requirements.
490.511	Calculation of National Highway System performance metrics.
490.513	Calculation of National Highway System performance measures.

**§ 490.501 Purpose.**

The purpose of this subpart is to implement the requirements of 23 U.S.C. 150(c)(3)(A)(ii)(IV) and (V) to establish performance measures for State Departments of Transportation (State DOTs) and Metropolitan Planning Organizations (MPOs) to use to assess:

(a) Performance of the Interstate System; and

(b) Performance of the non-Interstate National Highway System (NHS).

**§ 490.503 Applicability.**

(a) The performance measures are applicable to those portions of the mainline highways on the NHS as provided in paragraphs (a)(1) and (2) of this section (and in more detail in § 490.507):

(1) The Travel Time Reliability measures in § 490.507(a) are applicable to all directional mainline highways on the Interstate System and non-Interstate NHS.

(2) The Greenhouse Gas (GHG) measure in § 490.507(b) is applicable to all mainline highways on the Interstate and non-Interstate NHS.

(b) [Reserved]

**§ 490.505 Definitions.**

All definitions in § 490.101 apply to this subpart. Unless otherwise specified in this subpart, the following definitions apply to this subpart:

*Greenhouse gas (GHG)* is any gas that absorbs infrared radiation (traps heat) in the atmosphere. Ninety-five percent of transportation GHG emissions are carbon dioxide (CO<sub>2</sub>) from burning fossil fuel. Other transportation GHGs are methane (CH<sub>4</sub>), nitrous oxide (N<sub>2</sub>O), and hydrofluorocarbons (HFCs).

*Level of Travel Time Reliability* is a comparison, expressed as a ratio, of the 80th percentile travel time of a reporting segment to the “normal” (50th percentile) travel time of a reporting segment occurring throughout a full calendar year.

*Normal Travel Time (or 50th percentile travel time)* is the time of travel to traverse the full extent of a reporting segment which is greater than the time for 50 percent of the travel in a calendar year to traverse the same reporting segment.

*Travel time cumulative probability distribution* means a representation of all the travel times for a road segment during a defined reporting period (such as annually) presented in a percentile ranked order as provided in the travel time data set. The normal (50th percentile) and 80th percentile travel times used to compute the Travel Time Reliability measures may be identified by the travel time cumulative probability distribution.

**§ 490.507 National performance management measures for system performance.**

There are three performance measures to assess the performance of the Interstate System and the performance of the non-Interstate NHS for the purpose of carrying out the National

Highway Performance Program (referred to collectively as the NHS Performance measures).

(a) Two measures are used to assess reliability (referred to collectively as the Travel Time Reliability measures). They are:

(1) Percent of the person-miles traveled on the Interstate that are reliable (referred to as the Interstate Travel Time Reliability measure); and

(2) Percent of person-miles traveled on the non-Interstate NHS that are reliable (referred to as the Non-Interstate Travel Time Reliability measure).

(b) One measure is used to assess GHG emissions, which is the percent change in tailpipe CO<sub>2</sub> emissions on the NHS compared to the calendar year 2017 level (referred to as the GHG measure).

**§ 490.509 Data requirements.**

(a) Travel time data needed to calculate the Travel Time Reliability measures in § 490.507(a) shall come from the travel time data set, as specified in § 490.103(e).

(1) State DOTs, in coordination with MPOs, shall define reporting segments in accordance with § 490.103(f). Reporting segments must be contiguous so that they cover the full extent of the mainline highways of the NHS in the State.

(2) [Reserved]

(b) State DOTs shall not replace missing travel times when data are not available in the travel time data set (data not reported, or reported as “0” or null) as specified in § 490.511(b)(1)(v).

(c) AADT needed to calculate the Travel Time Reliability measures will be used, as reported to HPMS in June of the reporting year, to assign an annual volume to each reporting segment. Annual volume will be calculated as: Annual Volume = AADT × 365 days

(d) The average occupancy factors for the State and/or metropolitan area (as applicable) needed to calculate Travel Time Reliability measures shall come from the most recently available data tables published by FHWA unless using other allowed data source(s).

(e) If an NHS roadway is closed, the State DOT is not required to include those time periods for those segments of road in the calculations required for the Level of Travel Time Reliability (LOTTR) metric (see § 490.511(a)(1)).

(f) The FHWA will post on the FHWA Web site the tailpipe CO<sub>2</sub> emissions factors State DOTs and MPOs shall use in the calculation.

(g) Fuel sales information needed to calculate the GHG measure in § 490.507(b) shall come from either of the following two sources:



(1) The most recent final annual fuel sales data posted on the Web site by FHWA in Highway Statistics under “Motor Fuel Use (MF–21)” as of August 15th of the HPMS reporting year (<https://www.fhwa.dot.gov/policyinformation/statistics.cfm>); or

(2) The State DOT’s fuel sales data used to create the summary data included in FHWA’s MF–21, if it allows for a greater level of detail by fuel type. State DOTs shall make this data available to FHWA, upon request.

(h) Final annual vehicle miles traveled (VMT) needed to calculate the GHG measure in § 490.507(b) shall come from the most recently available data posted by FHWA in Highway Statistics in Table VM–3, “Federal-Aid Highway Travel” as of August 15th of the HPMS reporting year.

**§ 490.511 Calculation of National Highway System performance metrics.**

(a) Two performance metrics are required for the NHS Performance measures specified in § 490.507. These are:

(1) Level of Travel Time Reliability (LOTTR) for the Travel Time Reliability measures in § 490.507(a) (referred to as the LOTTR metric).

(2) Annual Total Tailpipe CO<sub>2</sub> Emissions on the NHS for the GHG

measure in § 490.507(b) (referred to as the GHG metric).

(b) The State DOT shall calculate the LOTTR metrics for each NHS reporting segment in accordance with the following:

(1) Data sets shall be created from the travel time data set to be used to calculate the LOTTR metrics. This data set shall include, for each reporting segment, a ranked list of average travel times for all traffic (“all vehicles” in NPMRDS nomenclature), to the nearest second, for 15 minute periods of a population that:

(i) Includes travel times occurring between the hours of 6 a.m. and 10 a.m. for every weekday (Monday–Friday) from January 1st through December 31st of the same year;

(ii) Includes travel times occurring between the hours of 10 a.m. and 4 p.m. for every weekday (Monday–Friday) from January 1st through December 31st of the same year;

(iii) Includes travel times occurring between the hours of 4 p.m. and 8 p.m. for every weekday (Monday–Friday) from January 1st through December 31st of the same year; and

(iv) Includes travel times occurring between the hours of 6: a.m. and 8: p.m. for every weekend day (Saturday–

Sunday) from January 1st through December 31st of the same year.

(2) The Normal Travel Time (50th percentile) shall be determined from each data set defined under paragraph (b)(1) of this section as the time in which 50 percent of the times in the data set are shorter in duration and 50 percent are longer in duration. The 80th percentile travel time shall be determined for each data set defined under paragraph (b)(1) of this section as the time in which 80 percent of the times in the data set are shorter in duration and 20 percent are longer in duration. Both the Normal and 80th percentile travel times can be determined by plotting the data on a travel time cumulative probability distribution graph or using the percentile functions available in spreadsheet and other analytical tools.

(3) Four LOTTR metrics shall be calculated for each reporting segment; one for each data set defined under paragraph (b)(1) of this section as the 80th percentile travel time divided by the 50th percentile travel time and rounded to the nearest hundredth.

(c) Tailpipe CO<sub>2</sub> emissions on the NHS for a given year are calculated as follows:

$$(\text{Tailpipe CO}_2 \text{ Emissions on NHS})_{CY} = \left( \sum_{t=1}^T (\text{Fuel Consumed})_t \times (\text{CO}_2 \text{ Factor})_t \right) \times \left( \frac{\text{NHS VMT}}{\text{Total VMT}} \right)$$

Where:

(Tailpipe CO<sub>2</sub> Emissions on NHS)<sub>CY</sub> = Total tailpipe CO<sub>2</sub> emissions on the NHS in a calendar year (to the nearest thousand tons);

T = the total number of on-road fuel types;

t = an on-road fuel type;

(Fuel Consumed)<sub>t</sub> = the quantity of total annual fuel consumed for on-road fuel type “t” (to the nearest thousand gallons);

(CO<sub>2</sub> Factor)<sub>t</sub> = is the amount of CO<sub>2</sub> released per unit of fuel consumed for on-road fuel type “t”;

NHS VMT = annual total vehicle-miles traveled on NHS (to the nearest one million vehicle-miles); and

Total VMT = annual total vehicle-miles traveled on all public roads (to the nearest one million vehicle-miles).

(d) For the GHG measure listed in § 490.507(b), MPOs are granted additional flexibility in how they calculate the GHG metric. MPOs may use the MPO share of the State’s VMT as a proxy for the MPO share of CO<sub>2</sub> emissions, VMT estimates along with

MOVES<sup>2</sup> emissions factors, FHWA’s Energy and Emissions Reduction Policy Analysis Tool (EERPAT) model, or other method the MPO can demonstrate has valid and useful results for CO<sub>2</sub> measurement.

(e) Starting in 2018 and annually thereafter, State DOTs shall report the LOTTR metrics, defined in paragraph (b) of this section, in accordance with HPMS Field Manual by June 15th of each year for the previous year’s measures.

(1) Metrics are reported to HPMS by reporting segment. All reporting segments where the NPMRDS is used shall be referenced by NPMRDS TMC(s) or HPMS section(s). If a State DOT elects to use, in part or in whole, the equivalent data set, all reporting segment shall be referenced by HPMS section(s); and

<sup>2</sup> MOVES (Motor Vehicle Emission Simulator) is EPA’s emission modeling system that estimates emissions for mobile sources at the national, county, and project level for criteria air pollutants, greenhouse gases, and air toxics. See <https://www.epa.gov/moves>.

(2) The LOTTR metric (to the nearest hundredths) for each of the four time periods identified in paragraphs (b)(1)(i) through (iv) of this section: the corresponding 80th percentile travel times (to the nearest second), the corresponding Normal (50th percentile) Travel Times (to the nearest second), and directional AADTs. If a State DOT does not elect to use FHWA supplied occupancy factor, as provided in § 490.507(d), that State DOT shall report vehicle occupancy factor (to the nearest tenth) to HPMS.

(f) Starting in 2018 and biennially thereafter, State DOTs shall report, as required in § 490.107, the GHG metrics, defined in paragraph (c) of this section. Specifically, the following GHG metric shall be reported in the State Biennial Performance Reports, as required in § 490.107:

(1) Total tailpipe CO<sub>2</sub> emissions, as specified in paragraph (c) of this section, generated by on-road sources travelling on the NHS (the GHG metric), and total on-road CO<sub>2</sub> emissions (the step in the calculation prior to

computing the GHG metric), in each of the following calendar years:

(i) 2017 (reported in 2018, unless FHWA states on its Web site, noted in § 490.509 (f), that there has been a change sufficient to warrant recalculation of the 2017 value); and

(ii) The 2 years preceding the reporting years.

(2) [Reserved]

**§ 490.513 Calculation of National Highway System performance measures.**

(a) The NHS Performance measures in § 490.507 shall be calculated in accordance with this section by State DOTs and MPOs to carry out the Interstate System and non-Interstate NHS performance-related requirements

of this part, and by FHWA to make the significant progress determinations specified in § 490.109 and to report on system performance.

(b) The Interstate Travel Time Reliability measure specified in § 490.507(a)(1) shall be computed to the nearest tenth of a percent as follows:

$$100 \times \frac{\sum_{i=1}^R SL_i \times AV_i \times OF_j}{\sum_{i=1}^T SL_i \times AV_i \times OF_j}$$

Where:

R = total number of Interstate System reporting segments that are exhibiting an LOTTR below 1.50 during all of the time periods identified in § 490.511(b)(1)(i) through (iv);

I = Interstate System reporting segment “i”;

SL<sub>i</sub> = length, to the nearest thousandth of a mile, of Interstate System reporting segment “i”;

AV<sub>i</sub> = total annual traffic volume to the nearest single vehicle, of the Interstate System reporting segment “i”;

J = geographic area in which the reporting segment “i” is located where a unique occupancy factor has been determined;

OF<sub>i</sub> = occupancy factor for vehicles on the NHS within a specified geographic area within the State/Metropolitan planning area; and

T = total number of Interstate System reporting segments.

(c) The Non-Interstate Travel Time Reliability measure specified in § 490.507(a)(2) shall be computed to the nearest tenth of a percent as follows:

$$100 \times \frac{\sum_{i=1}^R SL_i \times AV_i \times OF_j}{\sum_{i=1}^T SL_i \times AV_i \times OF_j}$$

Where:

R = total number of non-Interstate NHS reporting segments that are exhibiting an LOTTR below 1.50 during all of the time periods identified in § 490.511(b)(1)(i) through (iv);

i = non-Interstate NHS reporting segment “i”;

SL<sub>i</sub> = length, to the nearest thousandth of a mile, of non-Interstate NHS reporting segment “i”;

AV<sub>i</sub> = total annual traffic volume to the nearest 1 vehicle, of the Interstate System reporting segment “i”;

j = geographic area in which the reporting segment “i” is located where a unique occupancy factor has been determined;

OF<sub>j</sub> = occupancy factor for vehicles on the NHS within a specified geographic area within the State/Metropolitan planning area; and

T = total number of non-Interstate NHS reporting segments.

(d) The GHG measure specified in § 490.507(b) shall be computed to the nearest tenth of a percent as follows:

$$\frac{(\text{Tailpipe CO}_2 \text{Emissions on NHS})_{CY} - (\text{Tailpipe CO}_2 \text{Emissions on NHS})_{2017}}{(\text{Tailpipe CO}_2 \text{Emissions on NHS})_{2017}} \times 100$$

Where:

(Tailpipe CO<sub>2</sub> Emissions on NHS)<sub>CY</sub> = total tailpipe CO<sub>2</sub> emissions on the NHS in a calendar year (to the nearest thousand tons); and

(Tailpipe CO<sub>2</sub> Emissions on NHS)<sub>2017</sub> = total tailpipe CO<sub>2</sub> emissions on the NHS in the calendar year 2017 (to the nearest thousand tons).

**■ 4. Add subpart F to read as follows:**

**Subpart F—National Performance Management Measures To Assess Freight Movement on the Interstate System**

Sec.

490.601 Purpose.

490.603 Applicability.

490.605 Definitions.

490.607 National performance management measures to assess freight movement on the Interstate System.

490.609 Data requirements.

490.611 Calculation of Truck Travel Time Reliability metrics.

490.613 Calculation of Freight Reliability measure.

**§ 490.601 Purpose.**

The purpose of this subpart is to implement the requirements of 23 U.S.C. 150(c)(6) to establish performance measures for State Departments of Transportation (State DOTs) and the Metropolitan Planning Organizations (MPOs) to use to assess the national freight movement on the Interstate System.

**§ 490.603 Applicability.**

The performance measures to assess the national freight movement are applicable to the Interstate System.

**§ 490.605 Definitions.**

The definitions in § 490.101 apply to this subpart.

**§ 490.607 National performance management measures to assess freight movement on the Interstate System.**

The performance measure to assess freight movement on the Interstate System is the: Truck Travel Time Reliability (TTTR) Index (referred to as the Freight Reliability measure).

**§ 490.609 Data requirements.**

(a) Travel time data needed to calculate the Freight Reliability measure in § 490.607 shall come from the travel time data set, as specified in § 490.103(e).

(b) State DOTs, in coordination with MPOs, shall define reporting segments in accordance with § 490.103(f). Reporting segments must be contiguous so that they cover the full extent of the directional mainline highways of the Interstate in the State.

(c) When truck travel times are not available in the travel time data set (data not reported, or reported as “0” or null) as specified in § 490.611(a)(1)(ii) for a given 15 minute interval, State DOTs shall replace the missing travel time with an observed travel time that represents all traffic on the roadway during the same 15 minute interval (“all vehicles” in NPMRDS nomenclature).

(d) If an NHS roadway is closed, the State DOT is not required to include those time periods for those segments of

road in the calculations required for the Freight Reliability metric/measure.

**§ 490.611 Calculation of Truck Travel Time Reliability metrics.**

(a) The State DOT shall calculate the TTTR Index metric (referred to as the TTTR metric) for each Interstate System reporting segment in accordance with the following:

(1) A truck travel time data set shall be created from the travel time data set to be used to calculate the TTTR metric. This data set shall include, for each reporting segment, a ranked list of average truck travel times, to the nearest second, for 15 minute periods of a 24-hour period for an entire calendar year that:

(i) Includes “AM Peak” travel times occurring between the hours of 6 a.m. and 10 a.m. for every weekday (Monday–Friday) from January 1st through December 31st of the same year;

(ii) Includes “Mid Day” travel times occurring between the hours of 10 a.m. and 4 p.m. for every weekday (Monday–Friday) from January 1st through December 31st of the same year;

(iii) Includes “PM Peak” travel times occurring between the hours of 4 p.m. and 8 p.m. for every weekday (Monday–Friday) from January 1st through December 31st of the same year;

(iv) Includes “Overnight” travel times occurring between the hours of 8 p.m. and 6 a.m. for every day (Sunday–Saturday) from January 1st through December 31st of the same year; and

(v) Includes “Weekend” travel times occurring between the hours of 6 a.m. and 8 p.m. for every weekend day (Saturday–Sunday) from January 1st through December 31st of the same year.

(2) The Normal Truck Travel Time (50th percentile) shall be determined from each of the truck travel time data sets defined under paragraph (a)(1) of this section as the time in which 50 percent of the times in the data set are shorter in duration and 50 percent are longer in duration. The 95th percentile truck travel time shall be determined from each of the truck travel time data sets defined under paragraph (a)(1) of this section as the time in which 95 percent of the times in the data set are shorter in duration. Both the Normal and 95th percentile truck travel times can be determined by plotting the data on a travel time cumulative probability distribution graph or using the percentile functions available in spreadsheet and other analytical tools.

(3) Five TTTR metrics shall be calculated for each reporting segment; one for each data set defined under paragraph (a)(1) of this section as the 95th percentile travel time divided by

the Normal Truck Travel Time and rounded to the nearest hundredth.

(b) Starting in 2018 and annually thereafter, State DOTs shall report the TTTR metrics, as defined in this section, in accordance with the HPMS Field Manual by June 15th of each year for the previous year’s Freight Reliability measures.

(1) All metrics shall be reported to HPMS by reporting segments. When the NPMRDS is used metrics shall be referenced by NPMRDS TMC(s) or HPMS section(s). If a State DOT elects to use, in part or in whole, the equivalent data set, all reporting segment shall be referenced by HPMS section(s).

(2) The TTTR metric shall be reported to HPMS for each reporting segment (to the nearest hundredths) for each of the five time periods identified in paragraphs (a)(1)(i) through (v) of this section; the corresponding 95th percentile travel times (to the nearest second) and the corresponding normal (50th percentile) travel times (to the nearest second).

**§ 490.613 Calculation of Freight Reliability measure.**

(a) The performance for freight movement on the Interstate in § 490.607 (the Freight Reliability measure) shall be calculated in accordance with this section by State DOTs and MPOs to carry out the freight movement on the Interstate System related requirements of this part, and by FHWA to make the significant progress determinations specified in § 490.109 and to report on freight performance of the Interstate System.

(b) The Freight Reliability measure shall be computed to the nearest hundredth as follows:

$$\frac{\sum_{i=1}^T (SL_i \times \max TTTR_i)}{\sum_{i=1}^T (SL_i)}$$

Where:

$i$  = An Interstate System reporting segment;  
 $\max TTTR_i$  = The maximum TTTR of the five time periods in paragraphs (a)(1)(i) through (v) of § 490.611, to the nearest hundredth, of Interstate System reporting segment “ $i$ ”;

$SL_i$  = Segment length, to the nearest thousandth of a mile, of Interstate System reporting segment “ $i$ ”; and  
 $T$  = A total number of Interstate System reporting segments.

■ 5. Add subpart G to read as follows:

**Subpart G—National Performance Management Measure for Assessing the Congestion Mitigation and Air Quality Improvement Program—Traffic Congestion**

Sec.

490.701 Purpose.

490.703 Applicability.

490.705 Definitions.

490.707 National performance management measure for traffic congestion.

490.709 Data requirements.

490.711 Calculation of Peak Hour Excessive Delay metric.

490.713 Calculation of Traffic Congestion measures.

**§ 490.701 Purpose.**

The purpose of this subpart is to implement the requirements of 23 U.S.C. 150(c)(5)(A) to establish performance measures for State DOTs and the MPOs to use in assessing CMAQ Traffic Congestion for the purpose of carrying out the CMAQ program.

**§ 490.703 Applicability.**

The CMAQ Traffic Congestion performance measures are applicable to all urbanized areas that include NHS mileage and with a population over 1 million for the first performance period and in urbanized areas with a population over 200,000 for the second and all other performance periods, that are, in all or part, designated as nonattainment or maintenance areas for ozone (O<sub>3</sub>), carbon monoxide (CO), or particulate matter (PM<sub>10</sub> and PM<sub>2.5</sub>) National Ambient Air Quality Standards (NAAQS).

**§ 490.705 Definitions.**

All definitions in § 490.101 apply to this subpart. Unless otherwise specified, the following definitions apply in this subpart:

*Excessive delay* means the extra amount of time spent in congested conditions defined by speed thresholds that are lower than a normal delay threshold. For the purposes of this rule, the speed threshold is 20 miles per hour (mph) or 60 percent of the posted speed limit, whichever is greater.

*Peak Period* is defined as weekdays from 6 a.m. to 10 a.m. and either 3 p.m. to 7 p.m. or 4 p.m. to 8 p.m. State DOTs and MPOs may choose whether to use 3 p.m. to 7 p.m. or 4 p.m. to 8 p.m.

**§ 490.707 National performance management measures for traffic congestion.**

There are two performance measures to assess traffic congestion for the purpose of carrying out the CMAQ program (referred to collectively as the CMAQ Traffic Congestion measures. They are:

(a) Annual Hours of Peak Hour Excessive Delay (PHED) Per Capita (referred to as the PHED measure); and

(b) Percent of Non-SOV Travel.



**§ 490.709 Data requirements.**

(a) Travel time data needed to calculate the PHED measure in § 490.707(a) shall come from the travel time data set, as specified in § 490.103(e).

(b) State DOTs, in coordination with MPOs, shall define reporting segments in accordance with § 490.103(f). Reporting segments must be contiguous so that they cover the full extent of the directional mainline highways of the NHS in the urbanized area(s).

(c) State DOTs shall develop hourly traffic volume data for each reporting segment as follows:

(1) State DOTs shall measure or estimate hourly traffic volumes for Peak Periods on each weekday of the reporting year by using either paragraph (c)(1)(i) or (ii) of this section.

(i) State DOTs may use hourly traffic volume counts collected by continuous count stations and apply them to multiple reporting segments; or

(ii) State DOTs may use Annual Average Daily Traffic (AADT) reported to the HPMS to estimate hourly traffic volumes when no hourly volume counts exist. In these cases the AADT data used should be the most recently available, but not more than 2 years older than the reporting period (e.g., if reporting for calendar year 2018, AADT should be from 2016 or 2017) and should be split to represent the appropriate direction of travel of the reporting segment.

(2) State DOTs shall assign hourly traffic volumes to each reporting segment by hour (e.g., between 8 a.m. and 8:59 a.m.).

(3) State DOTs shall report the methodology they use to develop hourly traffic volume estimates to FHWA no later than 60 days before the submittal of the first Baseline Performance Period Report.

(4) If a State DOT elects to change the methodology it reported under paragraph (c)(3) of this section, then the State DOT shall submit the changed methodology no later than 60 days before the submittal of next State Biennial Performance Report required in § 490.107(b).

(5) If an NHS roadway is closed, the State DOT is not required to include those time periods for the segment of road in the calculation required for this metric and measure.

(d) State DOTs shall develop annual vehicle classification data for each reporting segment using data as follows:

(1) State DOTs shall measure or estimate the percentage of cars, buses, and trucks, relative to total AADT for each segment using either paragraph (d)(1)(i) or (ii) of this section.

(i) State DOTs may use annual traffic volume counts collected by continuous count stations to estimate the annual percent share of traffic volumes for cars, buses, and trucks for each segment; or

(ii) State DOTs may use AADT reported to the HPMS to estimate the annual percent share of traffic volumes for cars, buses, and trucks, where:

(A) Buses = value in HPMS Data Item "AADT\_Single\_Unit";

(B) Trucks = value in HPMS Data Item "AADT\_Combination"; and

(C) Cars = subtract values for Buses and Trucks from the value in HPMS Data Item "AADT".

(iii) If a State DOT uses the data reported to the HPMS in paragraph (d)(1)(ii) of this section, then the data values should be split to represent the appropriate direction of travel of the reporting segment.

(2) State DOTs shall report the methodology they use to develop annual percent share of traffic volume by vehicle class to FHWA no later than 60 days before the submittal of the first Baseline Performance Period Report.

(3) If a State DOT elects to change the methodology it reported under paragraph (d)(2) of this section, then the State DOT shall submit the changed methodology no later than 60 days before the submittal of next State Biennial Performance Report required in § 490.107(b).

(e) State DOTs shall develop annual average vehicle occupancy (AVO) factors for cars, buses, and trucks in applicable urbanized areas using either method under paragraph (e)(1)(i) or (ii) of this section.

(1) State DOTs shall measure or estimate annual vehicle occupancy factors for cars, buses, and trucks in applicable urbanized areas.

(i) State DOTs shall use estimated annual vehicle occupancy factors for cars, buses, and trucks in urbanized areas provided by FHWA; and/or

(ii) State DOTs may use an alternative estimate of annual vehicle occupancy factors for a specific reporting segment(s) for cars, buses, and trucks in urbanized areas, provided that it is more specific than the data provided by FHWA.

(f) All State DOTs and MPOs contributing to the unified target for the applicable area as specified in § 490.105(d)(2) shall agree to using one of the methods specified in paragraph (f)(1)(i), (ii), or (iii) of this section to identify the data that will be used to determine the Percent of Non-SOV Travel for the applicable urbanized area.

(1) The data to determine the Percent of Non-SOV Travel measure shall be

developed using any one of the following methods.

(i) *Method A—American Community Survey.* Populations by predominant travel to commute to work may be identified from Table DP03 of the American Community Survey using the totals by transportation mode listed within the "Commuting to Work" subject heading under the "Estimate" column of the table. The "5 Year Estimate" DP03 table using a geographic filter that represents the applicable "Urban Area" shall be used to identify these populations. The Percent of Non-SOV Travel measure shall be developed from the most recent data as of August 15th of the year in which the State Biennial Performance Report is due to FHWA.

(ii) *Method B—local survey.* The Percent of Non-SOV Travel may be estimated from a local survey focused on either work travel or household travel for the area and conducted as recently as 2 years before the beginning of the performance period. The survey method shall estimate travel mode choice for the full urbanized area using industry accepted methodologies and approaches resulting in a margin of error that is acceptable to industry standards, allow for updates on at least a biennial frequency, and distinguish non-SOV travel occurring in the area as a percent of all work or household travel.

(iii) *Method C—system use measurement.* The volume of travel using surface modes of transportation may be estimated from measurements of actual use of each transportation mode. Sample or continuous measurements may be used to count the number of travelers using different surface modes of transportation. The method used to count travelers shall estimate the total volume of annual travel for the full urbanized area within a margin of error that is acceptable to industry standards and allows for updates on at least a biennial frequency. The method shall include sufficient information to calculate the amount of non-SOV travel occurring in the area as a percentage of all surface transportation travel. State DOTs are encouraged to report use counts to FHWA that are not included in currently available national data sources.

(2) State DOTs shall report the data collection method that is used to determine the Percent of Non-SOV Travel measure for each applicable urbanized area in the State to FHWA in their first Baseline Performance Period Report required in § 490.107(b)(1). The State DOT shall include sufficient detail to understand how the data are

collected if either Method B or Method C are used for the urbanized area. This method shall be used for the full performance period for each applicable urbanized area.

(3) If State DOTs and MPOs that contribute to an applicable urbanized area elect to change the data collection method reported under paragraph (f)(2) of this section, then each respective State DOT shall report this change in their next Baseline Performance Report required in § 490.107(b)(1). The new method reported as a requirement of this paragraph shall not be used until the beginning of the next performance period for the Baseline Performance Report in which the method was reported to be changed.

(g) Populations of urbanized areas shall be as identified based on the most recent annual estimates published by the U.S. Census available 1 year before the State DOT Baseline Performance Period Report is due to FHWA to identify applicability of the CMAQ Traffic Congestion measures in § 490.707(a) and (b) for each performance period, as described in § 490.105(e)(8)(iii)(D) and (f)(5)(iii)(D). For computing the PHED measure in § 490.713(b), the most recent annual

population estimate published by the U.S. Census, at the time when the State DOT Biennial Performance Period Report is due to FHWA shall be used.

(h) Nonattainment and maintenance area determinations for the CMAQ Traffic Congestion measures:

(1) The CMAQ Traffic Congestion measures apply to nonattainment and maintenance areas. Such areas shall be identified based on the effective date of U.S. EPA's designations under the NAAQS in 40 CFR part 81, as of the date 1 year before the State DOT Baseline Performance Period Report is due to FHWA.

(2) The nonattainment and maintenance areas to which the CMAQ Traffic Congestion measures applies shall be revised if, on the date 1 year before the State DOT Mid Performance Period Progress Report is due to FHWA, the area is no longer in nonattainment or maintenance for a criteria pollutant included in § 490.703.

**§ 490.711 Calculation of Peak Hour Excessive Delay metric.**

(a) The performance metric required to calculate the measure specified in § 490.707(a) is Total Peak Hour Excessive Delay (person-hours)(referred to as the PHED metric). The following

paragraphs explain how to calculate this PHED metric.

(b) State DOTs shall use the following data to calculate the PHED metric:

(1) Travel times of all traffic ("all vehicles" in NPMRDS nomenclature) during each 15 minute interval for all applicable reporting segments in the travel time data set occurring for peak periods from January 1st through December 31st of the same year;

(2) The length of each applicable reporting segment, reported as required under § 490.709(b);

(3) Hourly volume estimation for all days and for all reporting segments where excessive delay is measured, as specified in § 490.709(c);

(4) Annual vehicle classification data for all days and for all reporting segments where excessive delay is measured, as specified in § 490.709(d); and

(5) Annual vehicle occupancy factors for cars, buses, and trucks for all days and for all reporting segments where excessive delay is measured, as specified in § 490.709(e).

(c) The State DOT shall calculate the "excessive delay threshold travel time" for all applicable travel time segments as follows:

*Excessive Delay Threshold Travel Time<sub>s</sub>*

$$= \left( \frac{\text{Travel Time Segment Length}_s}{\text{Threshold Speed}_s} \right) \times 3,600$$

Where:

Excessive Delay Threshold Travel Time<sub>s</sub> = the time of travel, to the nearest whole second, to traverse the Travel Time Segment at which any longer measured travel times would result in excessive delay for the travel time segment "s";

Travel Time Segment Length<sub>s</sub> = total length of travel time segment to the nearest thousandth of a mile for travel time reporting segment "s"; and

Threshold Speed<sub>s</sub> = the speed of travel at which any slower measured speeds would result in excessive delay for travel time reporting segment "s." As defined in § 490.705, the speed threshold is 20 miles per hour (mph) or 60 percent of the posted speed limit travel time reporting segment "s," whichever is greater.

(d) State DOTs shall determine the "excessive delay" for each 15 minute

bin of each reporting segment for every hour and every day in a calendar year as follows:

(1) The travel time segment delay (RSD) shall be calculated to the nearest whole second as follow:

$$RSD_{s,b} - \text{Excessive Delay Threshold Travel Time}_s \text{ and } RSD_{s,b} \leq 900 \text{ seconds}$$

Where:

RSD<sub>s,b</sub> = travel time segment delay, calculated to the nearest whole second, for a 15-minute bin "b" of travel time reporting segment "s" for in a day in a calendar year. RSD(s)<sub>b</sub> not to exceed 900 seconds;

Travel time<sub>s,b</sub> = a measured travel time, to the nearest second, for 15-minute time bin "b" recorded for travel time reporting segment "s";

Excessive Delay Threshold Travel Time<sub>s</sub> =

The maximum amount of time, to the nearest second, for a vehicle to traverse through travel time segment "s" before excessive delay would occur, as specified in paragraph (c) of this section;

b = a 15-minute bin of a travel time reporting segment "s"; and

s = a travel time reporting segment.

(2) Excessive delay, the additional amount of time to traverse a travel time segment in a 15-minute bin as compared to the time needed to traverse the travel time segment when traveling at the excessive delay travel speed threshold, shall be calculated to the nearest thousandths of an hour as follows:

$$\text{Excessive Delay}_{s,b} = \begin{cases} \frac{RSD_{s,b}}{3,600} & \text{when } RSD_{s,b} \geq 0 \\ \text{or} \\ 0 & \text{when } RSD_{s,b} < 0 \end{cases}$$

Where:

Excessive Delay<sub>s,b</sub> = excessive delay, calculated to the nearest thousandths of an hour, for 15-minute bin “b” of travel time reporting segment “s”;

RSD<sub>s,b</sub> = the calculated travel time reporting segment delay for fifteen minute bin “b” of a travel time reporting segment “s,” as described in paragraph (d)(1) of this section;  
b = a fifteen minute bin of a travel time reporting segment “s”; and

s = a travel time reporting segment.

(e) State DOTs shall use the hourly traffic volumes as described in § 490.709(c) to calculate the PHED metric for each reporting segment as follows:

*Total Excessive Delay<sub>s</sub>*

= *AVO*

$$\times \sum_{d=1}^{TD} \left\{ \sum_{h=1}^{TH} \left[ \sum_{b=1}^{TB} \left( \text{Excessive Delay}_{s,b,h,d} \right. \right. \right. \\ \left. \left. \times \left( \frac{\text{hourly volume}}{4} \right)_{s,h,d} \right) \right] \right\}_h_d$$

Where:

Total Excessive Delay<sub>s</sub> (in person-hours) = the sum of the excessive delay, to the nearest thousandths, for all traffic traveling through single travel time reporting segment “s” on NHS within an urbanized area, specified in § 490.703, accumulated over the full reporting year;

AVO = Average Vehicle Occupancy;

s = a travel time reporting segment;

d = a day of the reporting year;

TD = total number of days in the reporting year;

h = single hour interval of the day where the first hour interval is 12 a.m. to 12:59 a.m.;

TH = total number of hour intervals in day “h”;

b = 15-minute bin for hour interval “h”;

TB = total number of 15-minute bins where travel times are recorded in

the travel time data set for hour interval “h”;

Excessive Delay<sub>s,b,h,d</sub> = calculated excessive travel time, in hundredths of an hour, for 15 minute bin (b), hour interval (h), day (d), and travel time segment (s), as described in paragraph (d)(2) of this section; and

$$\left( \frac{\text{hourly volume}}{4} \right)_{s,h,d}$$

Where the equation equals hourly traffic volume, to the nearest tenth, for hour interval “h” and day “d” that corresponds to 15-minute bin “b” and travel time reporting segment “s” divided by 4. For example, the 9 a.m. to 9:15 a.m. minute bin would be assigned one fourth of the hourly traffic volume for the 9 a.m. to 9:59 a.m. hour on the roadway in which travel time segment is included;

$$AVO = (P_C \times AVO_C) + (P_B \times AVO_B) + (P_T \times AVO_T)$$

Where:

P<sub>C</sub> = the percent of cars as a share of total AADT on the segment as specified in § 490.709(d);

P<sub>B</sub> = the percent of buses as a share of total AADT on the segment as specified in § 490.709(d);

P<sub>T</sub> = the percent of trucks as a share of total AADT on the segment as specified in § 490.709(d);

AVO<sub>C</sub> = the average vehicle occupancy of cars as specified in § 490.709(e);

AVO<sub>B</sub> = the average vehicle occupancy of buses as specified in § 490.709(e); and

AVO<sub>T</sub> = the average vehicle occupancy of trucks as specified in § 490.709(e).

(f) Starting in 2018 and annually thereafter, State DOTs shall report the PHED metric (to the nearest one hundredth hour) in accordance with HPMS Field Manual by June 15th of each year for the previous year’s PHED measures. The PHED metric shall be reported for each reporting segment. All reporting segments of the NPMRDS shall be referenced by NPMRDS TMC or HPMS section(s). If a State DOT elects to use, in part or in whole, the equivalent data set, all reporting segments shall be referenced by HPMS sections.

#### § 490.713 Calculation of Traffic Congestion measures.

(a) The performance measures in § 490.707 shall be computed in accordance with this section by State DOTs and MPOs to carry out CMAQ traffic congestion performance-related requirements of this part and by FHWA to report on traffic congestion performance.

(b) The performance measure for CMAQ traffic congestion specified in § 490.707, Annual Hours of Peak Hour Excessive Delay Per Capita (the PHED measure), shall be computed to the nearest tenth, and by summing the PHED metrics of all reporting segments in each of the urbanized area, specified in § 490.703, and dividing it by the population of the urbanized area to produce the PHED measure. The equation for calculating the PHED measure is as follows:



## Annual Hours of Peak Hour Excessive Delay per Capita

$$= \frac{\sum_{s=1}^T \text{Total Excessive Delays}_s}{\text{Total Population}}$$

Where:

Annual Hours of Peak Hour Excessive Delay per Capita = the cumulative hours of excessive delay, to the nearest tenth, experienced by all people traveling through all reporting segments during peak hours in the applicable urbanized area for the full reporting calendar year;

s = travel time reporting segment within an urbanized area, specified in § 490.703;

T = total number of travel time reporting segments in the applicable urbanized area;

Total Population = total hours of excessive delay in § 490.711(e) for all people traveling through travel time reporting segment “s” during a calendar year (as defined in § 490.711(f)); and

Total Population = the total population in the applicable urbanized area from the most recent annual population published by the U.S. Census at the time that the State Biennial Performance Period Report is due to FHWA.

(c) Calculation for the PHED measure, described in paragraph (b) of this section, and target establishment for the measure shall be phased-in under the

requirements in § 490.105(e)(8)(vi) and (f)(5)(vi).

(d) The performance measure for CMAQ traffic congestion specified in § 490.707(b), Percent of Non-SOV Travel, shall be computed as specified in paragraphs (d)(1) through (3) of this section corresponding to the method reported by the State DOT to collect travel data for the applicable area under § 490.709(f)(2).

(1) *Method A—American Community Survey.* The Percent of Non-SOV Travel shall be calculated to the nearest tenth of a percent using the following formula:

$$\text{Percent of Non-SOV Travel} = 100\% - \% \text{ SOV}$$

Where:

Percent of Non-SOV Travel = percent of commuting working population, to the nearest tenth of a percent, that predominantly do not commute by driving alone in a car, van, or truck,

including travel avoided by telecommuting; and

% SOV = percent estimate for “Car, truck, or van—drive alone”.

(2) *Method B—local survey.* The Percent of Non-SOV Travel shall be calculated using the data derived from local survey results as specified in § 490.709(f)(1)(ii). The Percent of Non-SOV Travel measure shall be calculated to represent travel that is not occurring by driving alone in a motorized vehicle, including travel avoided by telecommuting, as a percentage of all surface transportation occurring in the applicable area. The Percent of Non-SOV Travel measure shall be calculated to the nearest tenth of a percent.

(3) *Method C—system use measurement.* The Percent of Non-SOV Travel shall be calculated to the nearest tenth of a percent from the data collected from system use measurements as specified in § 490.709(f)(1)(iii) using the general form of the following formula:

$$\text{Percent of Non-SOV Travel} = 100 \times \left( \frac{\text{Volume}_{\text{non-sov}}}{(\text{Volume}_{\text{non-sov}}) + (\text{Volume}_{\text{sov}})} \right)$$

Where:

Percent of Non-SOV Travel = percentage of travel, to the nearest tenth of a percent, that is not occurring by driving alone in a motorized vehicle, including travel avoided by telecommuting

Volume<sub>non-sov</sub> = Annual volume of person travel occurring while driving alone in a motorized vehicle; and

Volume<sub>sov</sub> = Annual volume of person travel occurring on modes other than driving alone in a motorized vehicle, calculated as:

$$\sum_{m=1}^t \text{Volume}_m$$

Where:

m = travel mode (modes other than driving alone in a motorized vehicle, including travel avoided by telecommuting);

Volume<sub>m</sub> = annual volume of person travel for each mode, “m”; and

t = total number of modes that are not driving alone in a motorized vehicle.

■ 6. Add a new subpart H to read as follows:

### Subpart H- National Performance Management Measures to Assess the Congestion Mitigation and Air Quality Improvement Program—On-Road Mobile Source Emissions

Sec.

490.801 Purpose.

490.803 Applicability.

490.805 Definitions.

490.807 National performance management measure for assessing on-road mobile source emissions for the purposes of the Congestion Mitigation and Air Quality Improvement Program.

490.809 Data requirements.

490.811 Calculation of Total Emissions Reduction measure.

#### § 490.801 Purpose.

The purpose of this subpart is to implement the requirements of 23 U.S.C. 150(c)(5)(B) to establish performance measures for State DOTs and the MPOs to use in assessing on-road mobile source emissions.

#### § 490.803 Applicability.

(a) The on-road mobile source emissions performance measure (called the Total Emissions Reduction- see

§ 490.807) is applicable to all States and MPOs with projects financed with funds from the 23 U.S.C. 149 CMAQ program apportioned to State DOTs for areas designated as nonattainment or maintenance for ozone (O<sub>3</sub>), carbon monoxide (CO), or particulate matter (PM<sub>10</sub> and PM<sub>2.5</sub>) National Ambient Air Quality Standards (NAAQS).

(b) This performance measure does not apply to States and MPOs that do not contain any portions of nonattainment or maintenance areas for the criteria pollutants identified in paragraph (a) of this section.

#### § 490.805 Definitions.

All definitions in § 490.101 apply to this subpart. Unless otherwise specified in this subpart, the following definitions apply in this subpart:

*On-road mobile source* means, within this part, emissions created by all projects and sources financed with funds from the 23 U.S.C. 149 CMAQ program.

**§ 490.807 National performance management measure for assessing on-road mobile source emissions for the purposes of the Congestion Mitigation and Air Quality Improvement Program.**

The performance measure for the purpose of carrying out the CMAQ Program and for State DOTs to use to assess on-road mobile source emissions is "Total Emissions Reduction," which is the 2-year and 4-year cumulative reported emission reductions, for all projects funded by CMAQ funds, of each criteria pollutant and applicable precursors (PM<sub>2.5</sub>, PM<sub>10</sub>, CO, VOC, and NOx) under the CMAQ program for which the area is designated nonattainment or maintenance.

**§ 490.809 Data requirements.**

(a) The data needed to calculate the Total Emission Reduction measure shall come from the CMAQ Public Access System and includes:

- (1) The applicable nonattainment or maintenance area;
- (2) The applicable MPO; and

(3) The emissions reduction estimated for each CMAQ funded project for each of the applicable criteria pollutants and their precursors for which the area is nonattainment or maintenance.

(b) The State DOT shall:

(1) Enter project information into the CMAQ project tracking system for each CMAQ project funded in the previous fiscal year by March 1st of the following fiscal year; and

(2) Extract the data necessary to calculate the Total Emissions Reduction measures as it appears in the CMAQ Public Access System on July 1st for projects obligated in the prior fiscal year.

(c) Nonattainment and maintenance area determinations for the CMAQ Total Emissions Reduction measure:

(1) The CMAQ Total Emissions Reduction measure applies to nonattainment and maintenance areas. Such areas shall be identified based on the effective date of U.S. EPA's designations under the NAAQS in 40 CFR part 81, as of the date 1 year before

the State DOT Baseline Performance Period Report is due to FHWA.

(2) The nonattainment and maintenance areas to which the Total Emissions Reduction measure applies shall be revised if, on the date 1 year before the State DOT Mid Performance Period Progress Report is due to FHWA, the area is no longer in nonattainment or maintenance for a pollutant included in § 490.803.

**§ 490.811 Calculation of Total Emissions Reduction measure.**

(a) The Total Emission Reductions performance measure specified in § 490.807 shall be calculated in accordance with this section by State DOTs and MPOs to carry out CMAQ on-road mobile source emissions performance-related requirements of this part.

(b) The Total Emission Reductions measure for each of the criteria pollutant or applicable precursor for all projects reported to the CMAQ Public Access System shall be calculated to the nearest one thousandths, as follows:

*Total Emission Reduction<sub>p</sub>*

$$= \sum_{i=1}^T \text{Daily Kilograms of Emission Reductions}_{p,i}$$

Where:

i = applicable projects reported in the CMAQ Public Access System for the first 2 Federal fiscal years of a performance period and for the entire performance period, as described in in § 490.105(e)(4)(i)(B);  
p = criteria pollutant or applicable precursor: PM<sub>2.5</sub>, PM<sub>10</sub>, CO, VOC, or NOx;  
Daily Kilograms of Emission Reductions<sub>p,i</sub> = total daily kilograms, to the nearest one

thousandths, of reduced emissions for a criteria pollutant or an applicable precursor "p" in the in the first year the project is obligated;  
T = total number of applicable projects reported to the CMAQ Public Access System for the first 2 Federal fiscal years of a performance period and for the entire performance period, as described in § 490.105(e)(4)(i)(B); and

Total Emission Reduction<sub>p</sub> = cumulative reductions in emissions over 2 and 4 Federal fiscal years, total daily kilograms, to the nearest one thousandths, of reduced emissions for criteria pollutant or precursor "p."

[FR Doc. 2017-00681 Filed 1-12-17; 4:15 pm]

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## DEPARTMENT OF TRANSPORTATION

### Federal Highway Administration

#### 23 CFR Part 490

[Docket No. FHWA–2013–0054]

RIN 2125–AF54

#### National Performance Management Measures; Assessing Performance of the National Highway System, Freight Movement on the Interstate System, and Congestion Mitigation and Air Quality Improvement Program

**AGENCY:** Federal Highway Administration (FHWA), Department of Transportation (DOT).

**ACTION:** Notice of proposed rulemaking (NPRM).

**SUMMARY:** This NPRM is the third in a series of three related NPRMs that together establishes a set of performance measures for State departments of transportation (State DOT) and Metropolitan Planning Organizations (MPO) to use as required by Moving Ahead for Progress in the 21st Century Act (MAP–21). The measures proposed in this third NPRM would be used by State DOTs and MPOs to assess the performance of the Interstate and non-Interstate National Highway System (NHS) for the purpose of carrying out the National Highway Performance Program (NHPP); to assess freight movement on the Interstate System; and to assess traffic congestion and on-road mobile source emissions for the purpose of carrying out the Congestion Mitigation and Air Quality Improvement (CMAQ) Program. This third performance measure NPRM also includes a discussion that summarizes all three of the national performance management measures proposed rules and the comprehensive regulatory impact analysis (RIA) to include all three NPRMs.

**DATES:** Comments must be received on or before August 20, 2016. Late comments will be considered to the extent practicable.

**ADDRESSES:** You may submit comments identified by the docket number FHWA–2013–0020 by any one of the following methods:

*Fax:* 1–202–493–2251;

*Mail:* U.S. Department of

Transportation, Docket Operations, M–30, West Building Ground Floor, Room W12–140, 1200 New Jersey Avenue SE., Washington, DC 20590;

*Hand Delivery:* U.S. Department of Transportation, Docket Operations, West Building Ground Floor, Room W12–140, 1200 New Jersey Avenue SE.,

Washington, DC 20590, between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays; or electronically through the Federal eRulemaking Portal: <http://www.regulations.gov>. Follow the online instructions for submitting comments.

**Instructions:** All submissions must include the agency name, docket name and docket number or Regulatory Identifier Number (RIN) for this rulemaking (2125–AF54). In accordance with 5 U.S.C. 553(c), DOT solicits comments from the public to better inform its rulemaking process. The DOT posts these comments, without edit, including any personal information the commenter provides, to [www.regulations.gov](http://www.regulations.gov), as described in the system of records notice (DOT/ALL–14 FDMS), which can be reviewed at [www.dot.gov/privacy](http://www.dot.gov/privacy).

**Docket:** For access to the docket to read background documents or comments received, go to <http://www.regulations.gov> at any time or to U.S. Department of Transportation, Docket Operations, M–30, West Building Ground Floor, Room W12–140, 1200 New Jersey Avenue SE., Washington, DC 20950, between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays.

**FOR FURTHER INFORMATION CONTACT:** For technical information: Francine Shaw Whitson, Office of Infrastructure, (202) 366–8028; for legal information: Anne Christenson, Office of Chief Counsel, (202) 366–0740, Federal Highway Administration, 1200 New Jersey Avenue SE., Washington, DC 20590. Office hours are from 8:00 a.m. to 4:30 p.m. ET, Monday through Friday, except Federal holidays.

**SUPPLEMENTARY INFORMATION:** The FHWA has published two additional NPRMs to establish the remaining measures required under 23 U.S.C. 150(c). The first performance measure NPRM proposed establishment of measures to carry out the Highway Safety Improvement Program (HSIP) and to assess serious injuries and fatalities, both in number and expressed as a rate, on all public roads. On March 15, 2016, FHWA published a final rule (FR Vol. 81 No. 50) covering the safety-related elements of the Federal-aid Highway Performance Measures Rulemaking. The second performance measure NPRM proposed establishment of performance measures to assess pavement and bridge conditions on the Interstate System and non-Interstate NHS for the purpose of carrying out the NHPP. This NPRM, the third performance measure NPRM, focuses on measures for the performance of the NHS, freight

movement on the Interstate System, and the CMAQ Program.

This last NPRM includes a discussion that summarizes all three of the rulemakings, both finished and underway, that will establish the measures required under 23 U.S.C. 150(c).

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  - B. Subpart E: National Performance Management Measures to Assess Performance of the National Highway System
  - C. Subpart F: National Performance Management Measures to Assess Freight Movement on the Interstate System
  - D. Subpart G: National Performance Management Measures to Assess the



Congestion Mitigation and Air Quality Improvement Program—Traffic Congestion

E. Subpart H: National Performance Management Measures to Assess the Congestion Mitigation and Air Quality Improvement Program—On-Road Mobile Source Emissions

## VII. Rulemaking Analyses and Notices

### I. Executive Summary

#### *a. Purpose of the Regulatory Action*

The MAP–21 (Pub. L. 112–141) transforms the Federal-aid highway program by establishing new requirements for performance management to ensure the most efficient investment of Federal transportation funds. Performance management increases the accountability and transparency of the Federal-aid highway program and provides for a framework to support improved investment decisionmaking through a focus on performance outcomes for key national transportation goals. As part of performance management, recipients of Federal-aid highway funds would make transportation investments to achieve performance targets that make progress toward the following national goals:<sup>1</sup>

- Congestion reduction.—To achieve a significant reduction in congestion on the NHS.
- System reliability.—To improve the efficiency of the surface transportation system.
- Freight movement and economic vitality.—To improve the national freight network, strengthen the ability of rural communities to access national and international trade markets, and support regional economic development.
- Environmental sustainability.—To enhance the performance of the transportation system while protecting and enhancing the natural environment.

The purpose of this rulemaking is to implement MAP–21 performance management requirements. Prior to MAP–21, there were no explicit requirements for State DOTs to demonstrate how their transportation program supported national performance outcomes. State DOTs were not required to measure condition/performance, to establish targets, to assess progress toward targets, or to report condition/performance in a nationally consistent manner that FHWA could use to assess the condition/performance of the entire system. Without States reporting on the above mentioned factors, it is difficult for FHWA to look at the effectiveness of

the Federal-aid highway program as a means to address surface transportation performance at a national level.

This proposed rule is one of several rulemakings that DOT is or will be conducting to implement MAP–21's new performance management framework. The collective rulemakings will establish the regulations needed to more effectively evaluate and report on surface transportation performance across the country. This rulemaking proposes regulations that would:

- Provide for greater consistency in the reporting of condition/performance;
- Require the establishment of targets that can be aggregated at the national level;
- Require reporting in a consistent manner on progress achievement; and
- Require State DOTs to make significant progress.

State DOTs would be expected to use the information and data generated as a result of the new regulations to better inform their transportation planning and programming decisionmaking. The new performance aspects of the Federal-aid program that would result from this rulemaking would provide FHWA the ability to better communicate a national performance story and to more reliably assess the impacts of Federal funding investments. The FHWA is in the process of creating a new public Web site to help communicate the national performance story. The Web site will likely include infographics, tables, charts, and descriptions of the performance data that the State DOTs would be reporting to FHWA.

The FHWA is required to establish performance measures through a rulemaking to assess performance in 12 areas<sup>2</sup> generalized as follows: (1) Serious injuries per vehicle miles traveled (VMT); (2) fatalities per VMT; (3) number of serious injuries; (4) number of fatalities; (5) pavement condition on the Interstate System; (6) pavement condition on the non-Interstate NHS; (7) bridge condition on the NHS; (8) traffic congestion; (9) on-road mobile source emissions; (10) freight movement on the Interstate System; (11) performance of the Interstate System; and (12) performance of the non-Interstate NHS. This rulemaking is the third of three rulemakings that together, will establish the performance measures for State DOTs and MPOs to use to carry out Federal-aid highway programs and to

assess performance in each of these 12 areas.

This rulemaking seeks to establish national measures for areas 8, 9, 10, 11, and 12, in the above list. This NPRM proposes to establish performance measures to assess the performance of the Interstate System and non-Interstate NHS for the purpose of carrying out the NHPP; to assess freight movement on the Interstate System; and to assess traffic congestion and on-road mobile source emissions for the purpose of carrying out the CMAQ program areas. The two proposed measures to assess performance of the Interstate are (1) Percent of the Interstate System providing for Reliable Travel, and (2) Percent of the Interstate System where peak hour travel times meet expectations. The two proposed measures to assess performance of the non-Interstate NHS are (1) Percent of the non-Interstate NHS providing for Reliable Travel and (2) Percent of the non-Interstate NHS where peak hour travel times meet expectations. The two proposed measures to assess freight movement on the Interstate System are (1) Percent of the Interstate System Mileage providing for Reliable Truck Travel Time, and (2) Percent of the Interstate System Mileage Uncongested. The proposed measure to assess traffic congestion is Annual Hours of Excessive Delay per Capita. Lastly, the proposed measure to assess on-road mobile source emissions is Total Tons of Emissions Reduced from CMAQ Projects for Applicable Criteria Pollutants and Precursors.

In addition, this NPRM builds on the framework of the previous performance rulemakings and the process proposed for State DOTs and MPOs to establish targets for each of the measures; the methodology to determine whether State DOTs have achieved or made significant progress toward their NHPP or National Highway Freight Program (NHFP) targets (targets for national measures areas 5, 6, 7, 10, 11, and 12, in the above list); and the process for State DOTs to use to report on progress toward achieving their targets.

#### *b. Summary of the Major Provisions of the Regulatory Action in Question*

The first performance rule established measures to be used by State DOTs to assess performance and to carry out the HSIP; the process for State DOTs and MPOs to use to establish safety targets; the methodology to determine whether State DOTs have achieved their safety targets; and the process for State DOTs to report on progress toward achieving their safety targets. The second performance rule proposed the

<sup>1</sup> These areas are listed within 23 U.S.C. 150(c), which requires the Secretary to establish measures to assess performance, condition, or emissions.

<sup>2</sup> These areas are listed within 23 U.S.C. 150(c), which requires the Secretary to establish measures to assess performance or condition.

establishment of performance measures to be used by State DOTs to assess the condition of pavements and bridges and to carry out the NHPP.

With this third rule, FHWA proposes the establishment of: Performance measures to be used by State DOTs and MPOs to assess performance of the Interstate System and non-Interstate NHS, traffic congestion, on-road mobile source emissions, and freight movement on the Interstate System; the process for State DOTs and MPOs to use to establish targets; the methodology to determine whether State DOTs have achieved or made significant progress toward their NHPP and NHFP performance targets; and the process for State DOTs to report on progress toward achieving their targets. This NPRM includes one general information area (Subpart A) that covers definitions, target establishment, reporting on progress, and how determinations would be made on whether State DOTs have achieved or made significant progress toward NHPP and NHFP targets. Subparts E through H propose performance measures in four areas: (1) National Highway Performance Program—Performance of the NHS covered in Subpart E; (2) Freight Movement on the Interstate System, covered in Subpart F; and two measures relating to the CMAQ Program: (3) Traffic Congestion covered in Subpart G, and (4) On-Road Mobile Source Emissions, covered in Subpart H.

The FHWA had proposed in the prior performance management NPRMs to establish one common effective date for its three performance measure final rules. While FHWA recognizes that one common effective date could be easier for State DOTs and MPOs to implement, the process to develop and implement all of the Federal-aid highway performance measures required in MAP-21 has been lengthy. It is taking more than 3 years since the enactment of MAP-21 to issue all three performance measure NPRMs (the first performance management NPRM was published on March 11, 2014; the second NPRM was published on January 5, 2015). Rather than waiting for all three rules to be final before implementing the MAP-21 performance measure requirements, FHWA has decided to phase in the effective dates for the three final rules for these performance measures so that each of the three performance measures rules will have individual effective dates. This allows FHWA and State DOTs to begin implementing some of the performance requirements much sooner than waiting for the rulemaking process to be complete for all the rules. The

FHWA believes that individual implementation dates will also help State DOTs transition to performance based planning.

On March 15, 2016, FHWA published a final rule (FR Vol. 81 No. 50) covering the safety-related elements of the Federal-aid Highway Performance Measures Rulemaking. With the staggered effective dates, this Rule will be implemented in its entirety before the other two rules are finalized.

Based on the timing of each individual rulemaking, FHWA would provide additional guidance to stakeholders on how to best integrate the new requirements into their existing processes. Under this approach, FHWA expects that even though the implementation for each rule would occur after each final rule is published, implementation for the second and the third performance measure final rules would ultimately be aligned through a common performance period. In the second performance management measure NPRM, FHWA proposed that the first 4-year performance period would start on January 1, 2016. However, FHWA proposes in this NPRM that the first performance period would begin on January 1, 2018. This would align the performance periods and reporting requirements for the proposed measures in the second and third performance management measure NPRMs. The FHWA has placed on the docket a timeline that illustrates how this transition could be implemented.<sup>3</sup> However, FHWA seeks comment from the public on what an appropriate effective date(s) could be.

#### Contents of 23 CFR Part 490

This NPRM proposes to add to Subpart A general information applicable to all of 23 CFR part 490. This section includes requirements for data, target establishment, reporting on progress, and how to determine whether State DOTs have made significant progress toward achieving targets (for applicable measures). Subpart A also includes definitions and clarifies terminology associated with target establishment, reporting, and making significant progress for the performance measures specific to this NPRM. Subparts B, C and D were previously published in separate rulemaking documents.

Subpart B covered the proposed measures for the HSIP (RIN 2125–AF49); Subpart C proposed measures to assess pavement conditions on the NHS and the non-Interstate NHS (RIN 2125–

AF53); and Subpart D proposed measures to assess bridge conditions on the NHS (RIN 2125–AF53).

Subpart E proposes a travel time reliability measure and a peak hour travel time measure to assess the performance of the Interstate System and non-Interstate NHS. Subpart F establishes a travel time reliability measure and a congestion measure to assess freight movement on the Interstate System. Subpart G proposes an excessive delay measure to assess traffic congestion to carry out the CMAQ program. Subpart H proposes measures that will be used to assess the reduction of the criteria pollutants and applicable precursors to carry out the CMAQ program.

#### Summary of 23 CFR Part 490, Subpart A

In section 490.101, FHWA proposes to add definitions for “attainment area,” “criteria pollutant,” “Highway Performance Monitoring Systems (HPMS),” “freight bottleneck,” “full extent,” “mainline highways,” “maintenance area,” “measure,” “metric,” “Metropolitan Planning Organization (MPO),” “National Ambient Air Quality Standards (NAAQS),” “National Performance Management Research Data Set (NPMRDS),” “nonattainment area,” “non-urbanized area,” “reporting segment,” “target,” “Transportation Management Area (TMA),” “Travel Time Data Set,” “Travel Time Reliability,” and “Travel Time Segment,” which would be applicable to all subparts within Part 490.

In section 490.103, FHWA proposes data requirements that apply to more than one subpart in Part 490. Additional proposed data requirements unique to each subpart are included and discussed in each respective subpart. This section proposes the source of urbanized area boundaries as the most recent U.S. Decennial Census unless FHWA approves adjustments to the urbanized area. These boundaries are to be reported to HPMS. The boundaries in place at the time of the Baseline Performance Report are to apply to an entire performance period. Boundaries for the nonattainment and maintenance areas are proposed to be as designated and reported by the U.S. Environmental Protection Agency (EPA) for any of the criteria pollutants applicable under the CMAQ program. The FHWA is proposing that State DOTs and MPOs use the NPMRDS to calculate the travel time and speed related metrics (a metric means a quantifiable indicator of performance or condition that is used to develop the measures defined in this

<sup>3</sup> FHWA Sample MAP21 Rule Making Implementation and Reporting Dates.

rule), unless more detailed and accurate travel time data exists locally and is approved by FHWA for use.

The NPMRDS is a dataset based on actual, observed data collected from probes, such as cell phones, navigation units, and other devices, in vehicles that travel along the NHS roadways. The dataset includes travel time information collected from probes that is available at 5 minute intervals for all segments of the Interstate and NHS where probes were present. The advent of readily available vehicle-based probe travel time data in recent years has led to a transformation in information available to the traveler and the ability for State DOTs and MPOs to develop performance measures based on this data. Because travel time data on the entire NHS is available from actual measurements tied to a date, time, and location on specific roadway segments, measuring the performance of the system, freight movement, and monitoring traffic congestion can be much more accurate, widespread, and detailed. The availability of this data also provides the potential to undertake before and after evaluations of transportation projects and strategies. These data requirements are detailed in proposed section 490.103.

The FHWA is proposing State DOTs and MPOs coordinate to develop reporting segments that would be used as the basis for calculating and reporting metrics to FHWA for the measures proposed in Subparts E, F, and G to assess the performance of the NHS, freight movement on the Interstate System, and traffic congestion. It is proposed that these reporting segments must be submitted to FHWA no later than the November 1 before the beginning of each performance period, and the same segments be used for Subparts E, F, and G for the entire performance period.

In section 490.105, FHWA proposes the minimum requirements that would be followed by State DOTs and MPOs to establish targets for all measures identified in section 490.105(c), which includes proposed measures both in this performance management NPRM and the second performance management NPRM. These requirements are being proposed to implement the 23 U.S.C. 150(d) and 23 U.S.C. 134(h)(2) target establishment provisions to provide for consistency necessary to evaluate and report progress at a State, MPO, and national level, while also providing a degree of flexibility for State DOTs and MPOs.

In section 490.107, FHWA proposes the minimum requirements that would be followed by State DOTs and MPOs in

the reporting targets for all proposed measures identified in both this performance management NPRM and the second performance management NPRM.

Section 490.109 proposes the method FHWA would use to determine if State DOTs have achieved or made significant progress toward their NHPP and NHFP targets. Significant progress would be determined by comparing the established target with the measured condition/performance associated with that target. If applicable, State DOTs would have the opportunity to discuss why targets were not achieved or significant progress was not made. For the NHPP and NHFP measures, if FHWA determines that a State DOT fails to make significant progress over each of the biennial performance reporting periods, then the State DOT is required to document in their next biennial performance report, though encouraged to document sooner, the actions they will undertake to achieve their targets.

#### Summary of Proposed Measures for This NPRM (Subparts E—H)

The NPRM gives details on specific measures, which are proposed to be added to four new Subparts of Part 490 that include:

Subpart E proposes two types of measures that reflect the *Travel Time Reliability* and *Peak Hour Travel Times* experienced by all traffic;

Subpart F proposes two measures that reflect the *Travel Time Reliability* and *Congestion* experienced by freight vehicles;

Subpart G proposes a measure that reflects the amount of *Excessive Delay* experienced by all traffic; and

Subpart H proposes a measure that reflects the *Emission Reduction* resulting through the delivery of projects.

*Travel Time Reliability* is being proposed to reflect the consistency in expected travel times when using the highway system by comparing the longer trips experienced by users to the amount of time they would normally expect the trip to take. In Subpart E, the NPRM proposes a reliability measure that compares the longer trip travel times to the time normally expected by the typical user of the roadway. The proposal assumes the system to be “reliable” when the longer travel times are no more than 50 percent higher than what would be normally expected by users. For example, the system would be perceived as unreliable when a 40 minute expected trip would take 60 or more minutes. This proposed measure of reliability only reflects the travel times experienced during the times

when the system is used the most, which is proposed to be between the hours of 6:00 a.m. to 8:00 p.m. This reliability approach is proposed to establish a measure specific to the Interstate System and the non-Interstate NHS.

Subpart F proposes a reliability measure to reflect the consistency of travel times on the system as experienced by shippers and suppliers. In this case the measure is a comparison of the longest travel times as compared to the time normally expected for the trip to take. The measure considers travel occurring at all hours of the day since this measure is designed to represent the perception of shippers and suppliers. In addition, this proposed freight movement measure is limited to the reliability of the Interstate System. As with all vehicles, the system is considered to be unreliable when the longest trip takes 50 percent more time than what would be normally expected. “Longer” and “Longest” trip travel times are described in more detail in the discussions of Section 490.505 and 490.607.

Also in Subpart E, as a complement to the reliability measure, the NPRM proposes a measure that evaluates the travel times experienced by all traffic during peak hours of the day. In contrast to the reliability measure which focuses on travel time variability, the peak hour measure is designed to measure the travel time during certain peak hours during the day, and how that compares to the desired travel time for that roadway at that time of day. The desired travel time is defined by the State DOT and MPO. It is expected that the desired time would be based on an analysis of how the roadway operates, its design features, any policy considerations, and how it functions within the larger system. As discussed previously, reliability reflects the consistency of trip time durations (e.g., A user makes a trip every morning that consistently takes 30 minutes). The peak hour travel time measure reflects the actual length of the trip compared to the desired travel time for that trip (e.g., Is the 30 minute trip duration too long for the time of day and the design of the roadway?). The peak hour measure reflects the actual travel times occurring on non-holiday weekdays during the morning and afternoon peak hours. The measure is designed to compare the longest trip time occurring during these hours to the amount of time desired to take the trip as perceived by the entities that operate the transportation system. This measurement approach is applied to the Interstate System and the non-Interstate NHS in only the largest urbanized areas



in the country (those with a population of 1 million or more). The proposed measure identifies the portions of the system where actual peak hour travel times are no more than 50 percent greater than the desired time to take the trip.

As a complement to the truck reliability measure, in Subpart F the NPRM is proposing a measure that reflects where trucks are experiencing congestion on the Interstate System. This measure identifies the portions of the Interstate System where actual truck travel speeds throughout the year are at least 50 mph. This measure considers use of the system every day throughout the year.

The NPRM includes two proposed measures that would be needed to carry out the CMAQ program. The first is a measure proposed in Subpart G that reflects traffic congestion and the second is a measure proposed in Subpart H that reflects emission reductions through the delivery of CMAQ funded projects.

The proposed traffic congestion measure reflects the total amount of time during the year when highway users have experienced excessive delay. The measure identifies times during the day when vehicles are travelling at speeds below 35 mph for freeways/expressways or 15 mph for all other NHS roadways. The proposed measure is designed to sum the additional travel times weighted by traffic volumes that occur during these excessive delay conditions throughout the year. Additionally, the measure is proposed to be expressed as a rate calculated by dividing the total excessive delay time by the population in the area.

The proposed emission reduction measure reflects the reductions in particular pollutants resulting from the delivery of CMAQ funded projects. The measure focuses on the total emissions reduced per fiscal year, by all CMAQ-funded projects by criteria pollutant and applicable precursors in nonattainment and maintenance areas.

More specific details on each of these measures, including information on the areas where the measure is applicable, are included in both the Performance Management Measure Analysis Section (Section V) and the Section-by-Section Discussion of the General Information and Proposed Performance Measures Sections (Section VI). In addition, FHWA has developed short fact sheets for each of these measures that will be available on the docket.

### *c. Incorporating the FAST Act*

On December 4, 2015, the President signed the Fixing America's Surface

Transportation (FAST) Act (Pub. L. 114–94; Dec. 4, 2015) into law. For the most part, the FAST Act is consistent with the performance management elements introduced by MAP–21. For convenience, this NPRM will refer to MAP–21 throughout the preamble to signify the fundamental changes MAP–21 made to States' authorities and responsibilities for overseeing the implementation of performance management.

For the purposes of this NPRM, the FAST Act made two relevant changes to the performance management requirements. The first is 23 U.S.C. 119(e)(7), which relates to the requirement for a significant progress determination for NHPP targets. The FAST Act amended this provision to remove the term “2 consecutive reports.” The FHWA has incorporated this change into this NPRM by removing the term “2 consecutive determinations,” which was proposed in section 490.107(b)(3)(ii)(G), as well as 490.109(f) of the second NPRM, published January 5, 2015, at 80 FR 326. In section 490.109(f) of the second NPRM, FHWA stated that if a State DOT does not achieve or make significant progress for its NHS performance targets for two consecutive reporting periods (4-year period), then the State DOT must document in its Biennial Report the actions it will take to achieve the targets. The FAST Act has changed this. As a result, this NPRM proposes to require State DOTs to take action when they do not make significant progress over one reporting period, which looks back over 2 years. With this change, the significant progress determination is still made every 2 years, but it looks back over a 2-year period instead of a 4-year period.

The second change the FAST Act made is the addition of 23 U.S.C. 167(j), which requires FHWA to determine if a State has made significant progress toward meeting the performance targets related to freight movement, established under section 150(d) and requires a description of the actions the State will undertake to achieve the targets if significant progress is not made. To meet these requirements, FHWA has incorporated language throughout this NPRM proposing to require the targets established for the measures in section 490.105(c)(6) to be included in the significant progress process and identifying the actions the State DOT will undertake to achieve the targets if significant progress is not made. The FHWA has called these the NHFP targets. The NHPP and NHFP use the same process for assessing significant

progress and determining if significant progress is made.

### *d. Costs and Benefits*

The FHWA estimated the incremental costs associated with the new requirements proposed in this regulatory action. The new requirements represent a change to the current practices of State DOTs and MPOs. The FHWA derived the costs of the new requirements by assessing the expected increase in the level of effort from labor for FHWA, State DOTs and MPOs to standardize and update data collection and reporting systems, as well as establish and report targets.

To estimate costs, FHWA multiplied the level of effort, expressed in labor hours, with a corresponding loaded wage rate<sup>4</sup> which varied by the type of laborer needed to perform the activity. Where necessary, capital costs were included as well. Most of these measures rely on the use and availability of NPMRDS data provided by FHWA for use by State DOTs and MPOs. Because there is uncertainty regarding the ongoing funding of NPMRDS by FHWA, FHWA estimated the cost of the proposed rule according to two scenarios. First, assuming that FHWA provides State DOTs and MPOs with the required data from NPMRDS, the 11-year undiscounted incremental costs to comply with this rule are \$165.3 million (Scenario 1).<sup>5</sup> Alternatively, under “worst case” conditions where State DOTs would be required to independently acquire the necessary data, the 11-year undiscounted incremental costs to comply with this rule are \$224.5 million (Scenario 2). The total 11-year undiscounted cost is approximately 36 percent higher under Scenario 2 than under Scenario 1.

The FHWA performed three separate break-even analyses as the primary approach to quantify benefits. The FHWA focused its break-even analyses

<sup>4</sup> Bureau of Labor Statistics (BLS) Employee Cost Index, 2012.

<sup>5</sup> In FHWA's first two performance measure NPRMs, it assessed costs over a 10-year study period. Because FHWA is now proposing individual effective dates for each of its performance measure rules rather than a common effective date, the timing of the full implementation of the measures has shifted. Using an 11-year study period ensures that the cost assessment includes the first 2 performance periods following the effective date of the rulemaking, which is comparable to what the 10-year study period assessed in the first two NPRMs. An 11-year study period captures the first year costs related to preparing and submitting the Initial Performance Report and a complete cycle of the incremental costs that would be incurred by State DOTs and MPOs for assembling and reporting all required measures as a result of the proposed rule. The FHWA anticipates that the recurring costs beyond this timeframe would be comparable to those estimated in the 10-year period of analysis.

for (1) enhancing performance of the Interstate System and non-Interstate NHS by relieving congestion, and (2) improving freight movement on the value of travel time savings. The FHWA estimated the number of hours spent in congestion needed to be saved by commuters and truck drivers in order for the benefits of the rule to justify the costs. For each of these break-even analyses, FHWA presents results for both Scenario 1 (FHWA provides access to NPMRDS) and Scenario 2 (State DOTs must independently acquire the necessary data). The FHWA focused the third break-even analysis on reducing emissions. The FHWA estimated the reduction in pollutant tons needed to be

achieved in order for the benefits of the rule to justify the costs. The aforementioned benefits are quantified within the analysis, however, there are other qualitative benefits which apply to the proposed rule as a whole that result from more informed decisionmaking on congestion and emissions-reducing project, program, and policy choices. The proposed rule also would yield greater accountability because MAP-21-mandated reporting would increase visibility and transparency of transportation decisionmaking. The data reported to FHWA by the States would be available to the public and would be used to communicate a national performance story. The FHWA is developing a public

Web site to share performance related information. In addition, the proposed rule would help focus the Federal-aid highway program on achieving balanced performance outcomes.

The results of the break-even analyses quantified the dollar value of the benefits that the proposed rule must generate to outweigh the cost of the proposed rule. The FHWA believes that the proposed rule would surpass these thresholds and, as a result, the benefits of the rule would outweigh the costs.

Table 1 displays the Office of Management and Budget (OMB) A-4 Accounting Statement as a summary of the cost and benefits calculated for this rule.

TABLE 1—OMB A-4 ACCOUNTING STATEMENT

Category	Estimates			Units			Notes
	Primary	Low	High	Year dollar	Discount rate (%)	Period covered	
Benefits:							
Annualized Monetized (\$millions/year).	None .....	None .....	None .....	NA .....	7	NA .....	Not Quantified.
Annualized Quantified	None .....	None .....	None .....	NA .....	3	NA .....	Not Quantified.
	None .....	None .....	None .....	NA .....	7	NA .....	Not Quantified.
	None .....	None .....	None .....	NA .....	3	NA .....	Not Quantified.
Qualitative .....	More informed decisionmaking on freight-, congestion-, and air quality-related project, program, and policy choices; greater accountability due to mandated reporting, increasing visibility and transparency; enhanced focus of the Federal-aid highway program on achieving balanced performance outcomes.						Proposed Rule RIA.
Costs:							
Annualized Monetized (\$millions/year).	Scenario 1: \$15,651,062.	.....	.....	2012 .....	7	11 Years .....	Proposed Rule RIA.
	Scenario 2: \$21,194,462.	.....	.....	2012 .....	3	11 Years.	
	Scenario 1: \$15,304,231.	.....	.....	2012 .....	7	11 Years .....	None.
	Scenario 2: \$20,760,510.	.....	.....	2012 .....	3	11 Years .....	None.
Annualized Quantified	None .....	None .....	None .....	2012 .....	7	11 Years .....	None.
Qualitative .....	None .....	None .....	None .....	2012 .....	3	11 Years .....	None.
Transfers:							
Federal Annualized Monetized (\$millions/year).	None .....	None .....	None .....	NA .....	7	NA .....	None.
From/To .....	None .....	None .....	None .....	NA .....	3	NA .....	None.
Other Annualized Monetized (\$millions/year).	From: .....	None .....	None .....	To: .....	7	NA .....	None.
From/To .....	None .....	None .....	None .....	NA .....	3	NA .....	None.
Effects:							
State, Local, and/or Tribal Government.	Scenario 1: \$15,271,675.	.....	.....	2012 .....	7	11 Years .....	Proposed Rule RIA.
	Scenario 2: \$21,189,733.	.....	.....	2012 .....	3	11 Years.	
	Scenario 1: \$14,931,176.	.....	.....	2012 .....	7	11 Years .....	Proposed Rule RIA.
	Scenario 2: \$20,756,223.	.....	.....	2012 .....	3	11 Years.	
Small Business .....	None			NA .....	NA	NA .....	None.
Wages .....	None						
Growth .....	Not Measured						

## II. Acronyms and Abbreviations

Acronym or abbreviation	Term
AADT .....	annual average daily traffic
AASHTO .....	American Association of State Highway and Transportation Officials
CAA .....	Clean Air Act
CFR .....	Code of Federal Regulations
CMAQ .....	Congestion Mitigation and Air Quality Improvement Program
CO .....	Carbon monoxide
DOT .....	U.S. Department of Transportation
EO .....	Executive Order
EPA .....	U.S. Environmental Protection Agency
FAST Act .....	Fixing America's Surface Transportation Act
FHWA .....	Federal Highway Administration
FPM .....	Freight Performance Measurement
FR .....	<b>Federal Register</b>
GHG .....	Greenhouse gas
HPMS .....	Highway Performance Monitoring System
HSIP .....	Highway Safety Improvement Program
HSP .....	Highway Safety Plan
IFR .....	Interim Final Rule
LOTTR .....	Level of Travel Time Reliability
MAP-21 .....	Moving Ahead for Progress in the 21st Century Act
MPH .....	Miles per hour
MPO .....	Metropolitan Planning Organizations
NAAQS .....	National Ambient Air Quality Standards
NCHRP .....	National Cooperation Highway Research Program
NHFP .....	National Highway Freight Program
NHPP .....	National Highway Performance Program
NHS .....	National Highway System
NHTSA .....	National Highway Traffic Safety Administration
NO <sub>x</sub> .....	Nitrogen oxide
NPMRDS .....	National Performance Management Research Data Set
NPRM .....	Notice of proposed rulemaking
O <sub>3</sub> .....	Ozone
OMB .....	Office of Management and Budget
PM .....	Particulate matter
PRA .....	Paperwork Reduction Act of 1995
RIA .....	Regulatory Impact Analysis
RIN .....	Regulatory Identification Number
SHSP .....	Strategic Highway Safety Plan
SME .....	Subject matter experts
State DOTs .....	State departments of transportation
TMA .....	Transportation Management Areas
TMC .....	Traffic Message Channel
TTI .....	Texas Transportation Institute
U.S.C. ....	United States Code
VMT .....	Vehicle miles traveled
VOC .....	Volatile organic compound

### III. Discussion of Stakeholder Engagement and Outreach

This section of the NPRM summarizes DOT's engagement and outreach with the public and with affected stakeholders during the NPRM development process and the viewpoints they shared with DOT during these consultations. Section III includes three sub-sections:

- Sub-section A provides a general description of the stakeholder consultation process;
- Sub-section B describes the broader public consultation process; and
- Sub-section C summarizes stakeholder viewpoints shared with DOT. This sub-section is organized sequentially around the three major measurement focus areas of this rulemaking, including: (1) system performance and traffic congestion

measures, (2) freight movement measures, and (3) on-road mobile source emissions measures.

Stakeholder engagement in developing the NPRMs is required by 23 U.S.C. 150(c) to enable DOT to obtain technical information as well as information on operational and economic impacts from stakeholders and the public. State DOTs, MPOs, transit agencies, and private and non-profit constituents across the country participated in the outreach efforts. A listing of each contact or series of contacts influencing the agency's position can be found in the docket.

#### *A. Consultation with State Departments of Transportation, Metropolitan Planning Organizations, and Other Stakeholders*

In accordance with 23 U.S.C. 150(c)(1), DOT consulted regularly with affected stakeholders (including State DOTs, MPOs, industry groups, advocacy organizations, etc.) to better understand the operational and economic impact of this proposed rule. In general, these consultations included:

- Conducting listening sessions and workshops to clarify stakeholder sentiment and diverse opinions on the interpretation of technical information on the potential economic and operational impacts of implementing 23 U.S.C. 150;
- Conducting listening sessions and workshops to better understand the state-of-the-practice on the economic



and operational impacts of implementing various noteworthy practices, emerging technologies, and data reporting, collection, and analysis frameworks;

- Hosting webinars with targeted stakeholder audiences to ask for their viewpoints through a chat pod or conference call;
- Attending meetings with non-DOT subject matter experts, including task forces, advocacy groups, private industry, non-DOT Federal employees, academia, etc., to discuss timelines, priorities, and the most effective methods for implementing 23 U.S.C. 150; and to discuss and collect information on the issues that need to be addressed or the questions that need to be answered in the NPRMs to facilitate efficient implementation.

#### B. Broader Public Consultation

It is DOT's policy to provide for and encourage public participation in the rulemaking process. In addition to the public participation that was coordinated in conjunction with the stakeholder consultation discussed above, DOT provided opportunities for broader public participation. The DOT invited the public to provide technical and economic information to improve the agency's understanding of a subject and the potential impacts of rulemaking. This was done by providing an email address ([performancemeasuresrulemaking@dot.gov](mailto:performancemeasuresrulemaking@dot.gov)) feature on FHWA's MAP-21 Web site to allow the public to provide comments and suggestions about the development of the performance measures and by holding national online dialogues and listening sessions to ask the public to post their ideas on national performance measures, standards, and policies. The DOT also conducted educational outreach to inform the public about transportation-related performance measures and standards, and solicited comments on them.

In accordance with 23 U.S.C. 150(c)(2)(A), FHWA will "provide States, metropolitan planning organizations, and other stakeholders not less than 90 days to comment on any regulation proposed by the Secretary . . ." During the notice and comment period, FHWA plans to hold public meetings to explain the provisions contained in these NPRMs, including this NPRM. All such meetings will be open to the public. However, all comments regarding the NPRM must be submitted in writing to the rulemaking docket.

#### C. Summary of Viewpoints Received

This section summarizes some of the common themes identified during the stakeholder outreach. It is important to note that some of the stakeholder comments related to more than one topic. In that case, the comments were placed under the theme most directly affected. The three themes include:

- Subparts E and G: Performance Management Measures to Assess Performance of the National Highway System and for Assessing Traffic Congestion.
- Subpart F: National Performance Management Measures to Assess Freight Movement on the Interstate System, and
- Subpart H: National Performance Management Measures for the Congestion Mitigation and Air Quality Improvement Program—On-Road Mobile Source Emissions.

##### 1. Summary of Viewpoints Received for Subparts E and G: Performance Management Measures To Assess Performance of the National Highway System and For Assessing Traffic Congestion

The FHWA separated the stakeholder comments on the performance and congestion measures into four general areas, listed below and the comments are summarized in each of those areas.

- Stakeholders' Viewpoints on Measurement Approaches
- Stakeholders' Viewpoints on Measurement Calculation Methods
- Stakeholders' Viewpoints on Measurement Principles
- Stakeholders' Viewpoints on Measurement Challenges

##### a. Stakeholders' Viewpoints on System Performance and Traffic Congestion Measurement Approaches

Stakeholders provided input to DOT on many different measure approaches for assessing either performance on the Interstate System and non-Interstate NHS for the purpose of carrying out the NHPP or assessing traffic congestion for the purpose of carrying out the CMAQ program. In general, stakeholders' suggested approaches fell within the following categories:

- *Speed and Traffic Flow-based Approaches*—Some stakeholders suggested continued use of traffic flow-based performance measures already widely in use by transportation agencies. They suggested several variations on traffic flow-based approaches including use of "Level of Service" classifications described in the Transportation Research Board's Highway Capacity Manual, volume to capacity ratios, or actual vehicle speeds

relative to free-flow speeds. Some stakeholders noted that data to support these measure approaches is widely available.

- *Spatial and Temporal Extent of Congestion-based Approaches*—Some stakeholders suggested that the spatial or temporal extent of congestion should be used as the basis for measuring performance. Suggestions included measures of the portion of system segments exceeding acceptable travel times and measures of how traffic and freight in a corridor are balanced across parallel roads and other modes. For a temporal-based measure, stakeholders suggested that this information could be used to help plan strategies for moving traffic from more congested to less congested routes or find the best ways to increase corridor capacity.

- *System Throughput Efficiency and Vehicle Occupancy-based Approaches*—Some stakeholders suggested throughput or vehicle occupancy-based measures of performance. Variations of throughput and vehicle occupancy measures suggested by stakeholders included the quantity of vehicles, goods, or people per lane hour or vehicle occupancy rates. Stakeholders described "spillover" benefits from improving throughput efficiency or vehicle occupancy including fewer crashes, lower emissions, and lower demand for infrastructure. Some stakeholders, however, noted that access to or availability of throughput or occupancy data for non-highway modes is a challenge.

- *Travel Time-based Approaches*—Many stakeholders suggested that travel time should be used as the basis for measuring performance. They offered many variations for characterizing travel time performance including "travel time per person," "travel time per vehicle," "travel delay per person," "travel delay per vehicle," and "percent of commutes less than 30 minutes," as well as use of these metrics to create planning time, travel time, travel slowness, or travel reliability indices. Some stakeholders also noted that travel time-based approaches might be adaptable for use in measuring transit, pedestrian, or bicycle system performance as data collection methods improve in the future. Many stakeholders who indicated support for travel time-based approaches stressed the importance of travel time reliability as a parameter that transportation users value highly. Some stakeholders who favored travel time-based approaches suggested that travel time measures are particularly relevant because travel time generally varies more than travel distance and it can be

influenced by State DOTs' and MPOs' operations practices.

- *Accessibility and Trip Generation-based Approaches*—Many stakeholders indicated a preference for accessibility measures over travel time-based measures as a basis for measuring performance. Several stakeholders indicated a concern that travel time-based measures emphasize mobility and may encourage dispersed land use patterns; whereas accessibility measures would emphasize ease of access to transportation options and consideration of where trips are generated. Stakeholders suggested many variations for characterizing accessibility or trip generation including “vehicle trip rate per household,” “transportation efficiency based on distance,” “miles traveled per employee,” “vanpool passenger mileage,” “number of employment locations reachable during rush hour within the travel time of the average commute,” “average home to work commute time,” “number of households able to reach businesses during off-peak hours within a reasonable time,” or “time required to go from place to place.” Some proponents of accessibility measures also suggested these measures may encourage greater consideration of non-auto travel modes like transit, carpooling, vanpooling, walking, and bicycling or options like telecommuting that tend to be more practical on systems with greater accessibility.

#### b. Stakeholders' Viewpoints on Measurement Calculation Methods

Stakeholders provided considerable input to DOT on detailed aspects of measure calculation methods. In general, stakeholders' suggestions fell within the following categories:

- *Geographic Focus for Measures*—Some stakeholders suggested performance measures should focus only on major corridors or in urbanized areas. They noted that current practice emphasizes corridor-level analysis and that the impact of heavily congested corridors may be masked by system-wide measures that include mostly uncongested system elements. Other stakeholders suggested that measures should focus on optimizing overall system performance rather than facility performance, with “system” being defined to include multimodal facilities as well as highways. Some stakeholders, however, suggested measures should be geographically scalable so that they can be used either on individual facilities or at a system-wide level.

- *Temporal Focus for Measures*—Some stakeholders suggested that

performance measures should place particular emphasis on peak period travel to maximize productivity of roads during peak periods by minimizing congestion, reducing growth in VMT, and using the most cost-effective methods to move people and goods. Other stakeholders suggested measures should generally be scalable on a temporal basis so they can be evaluated based on variable periods of time, such as individual hours, or grouped into peak periods.

- *Travel Time Measurement Options*—Stakeholders offered several suggestions for developing effective travel time-based measures:

- Selection of Travel Time Percentiles for Travel Reliability Index*—Some stakeholders suggested that when formulating a travel reliability index, the 85th or 90th percentile travel time should be used rather than the 95th percentile because the highest percentile travel times may be outliers that do not reflect the impacts of day-to-day operations strategies on the system.

- Use of Travel “Slowness” as an Index*—Some stakeholders suggested that reversing the widely used travel time index creates a more understandable metric by expressing congestion in terms of how slowly traffic is moving rather than in terms of how long trips take; they suggested, as an example, that describing a facility or system as operating at two-thirds of its desired performance (66.6 percent) is more understandable than saying it has a travel time index of 1.50.

- Threshold Times for Travel Indices*—Some stakeholders suggested that free flow speed is appropriate to use in calculating travel time-based indices. Other stakeholders indicated that free flow or posted speeds are unrealistic because State DOTs lack resources to achieve free flow conditions across their networks. “Maximum throughput” speed was suggested by some stakeholders as an alternative to free flow speed which they indicated is usually 70 to 85 percent of free flow but varies by facility.

- Travel Time Data Collection*—Some stakeholders suggested collecting origin and destination travel time data via techniques such as license plate surveys for vehicles or for other modes by riding bicycle or transit corridors to collect data.

- *Methods for Improving Accuracy of Vehicle Occupancy Counts*—Some stakeholders who supported vehicle occupancy-based measures suggested use of a combination of technology-

based data collection methods for improving the consistency of vehicle occupancy data, such as automated video image processing or in-vehicle technologies like seat belt detectors, and survey or counting techniques, such as manual field counts, home interviews, transit rider counts, census survey questions, or trip generation studies at employment centers. Stakeholders noted that occupancy data collection can be costly and may not need to be comprehensive to provide reasonable estimates.

- *Use Census and American Community Survey Data*—Some stakeholders suggested U.S. Census data could be used to examine performance, including information on commuting contained in the Census. Other stakeholders also suggested DOT could work with the Census to develop self-monitoring technologies, like Global Positioning Systems (GPS), or to build on the model of the American Community Survey and develop a continuous data collection resource for more detailed commuting information. Some stakeholders suggested developing standardized survey templates for communities to use for their own travel surveys.

#### c. Stakeholders' Viewpoints on Measurement Principles

Stakeholders provided DOT with input on general principles for selecting measures. In general, stakeholders' suggestions fell within the following categories:

- *Measures Should Be Simple To Understand*—Many stakeholders suggested that measures should be simple for the general public to understand, with some further suggesting that travel time-based measures, particularly travel reliability, are well understood by the general public.

- *Measures Should Rely on Readily Available Data*—Some stakeholders suggested that measures should not include burdensome data collection requirements and that data collection and analysis requirements should be flexible and relevant to community needs. Some stakeholders noted that investment is needed in resources such as analysis tools and reporting mechanisms and guidance to make performance measures meaningful and useful.

- *Measures Should Reflect MAP-21 National Goals*—Some stakeholders suggested that DOT should select a set of measures that reflect MAP-21 national goals that benefit from reducing congestion while providing safer, more



sustainable transportation systems that increase accessibility.

- *States Should Be Allowed To Select Measures/Avoid “One-Size-Fits-All” Measures*—Some stakeholders suggested that selection of measures should be at the discretion of the State DOT or MPO, with Federal requirements focusing on monitoring and reporting of States’ measures. It was also suggested that performance measures should not follow a “one-size-fits-all” approach and should allow for flexibility. Stakeholders noted that agencies have many options for improving traffic conditions, not only by adding capacity, but also by improving operations or reducing travel demand, and agencies’ choices will depend on unique constraints determined by available funding, physical geography, and regional priorities. Stakeholders suggested that FHWA should allow agencies to tell their “story” via customized measures that reflect the unique strategies they use to manage congestion. Other stakeholders suggested that differences in data availability from place to place will preclude standardization and reasoned that FHWA should allow variation in measures because this will ensure agencies begin to assess performance.

- *Ensure Standardization of Measures*—Some stakeholders suggested that although allowing use of different measures is appealing because it gives flexibility to States, it will also make national-level analysis difficult. Based on this reasoning, these stakeholders concluded that measures should be standardized.

- *Avoid Measures That Cause Policy Bias*—Some stakeholders suggested that the choice of measures (e.g., per vehicle mile or per capita) will influence how communities prioritize projects. For example, these stakeholders explained that policy decisions may be different if the measure is based on per vehicle mile crashes or per capita crashes because reporting changes in crashes per vehicle mile fails to reflect reductions in total vehicle mileage.

- *Measures Should Capture Wider Impacts*—Some stakeholders suggested that performance metrics should capture the effects of transportation investments on economic growth, efficient land use, environment, and community quality of life, and should support development of wider choices for solving congestion.

- *Measures for Individual Modes*—Some stakeholders suggested metrics should measure performance across transportation modes as a way to encourage development of multimodal transportation solutions. Other stakeholders expressed interest in

measures that allow direct comparison of the benefits and costs of all modes (e.g., transit, transportation demand management, road construction, system management). Stakeholders noted that if such metrics were pursued, they should consider the full extent of externalities in the calculation of costs. In particular, some stakeholders suggested that travel time-based measures should take into account all parts of a trip (walking, parking, driving, transit, etc.) to reflect overall transportation network performance.

- *Measures Should Establish Minimum Acceptable Performance Levels*—Some stakeholders suggested that performance measures should help transportation agencies identify where corridors fall below minimum performance levels and help communities identify alternatives that allow them to reach that minimum performance level.

- *Distinguish Between Congestion and Reliability*—Some stakeholders noted a distinction between recurrent congestion and travel time reliability, noting that agencies typically have limited control over recurrent congestion that is caused by physical capacity constraints. On the other hand, stakeholders explained that reliability can be influenced by efficient management of non-recurring incidents. A focus on reliability, according to these stakeholders, would give agencies credit for operational improvements that may improve travel time reliability but do not necessarily increase capacity.

#### d. Stakeholders’ Viewpoints on Measurement Challenges

Stakeholders provided DOT with input on perceived measurement challenges. In general, stakeholders’ suggestions fell within the following categories:

- *Travel Time-based Measures Do Not Capture System Accessibility Benefits*—Some stakeholders expressed concern that reliance on travel time-based measures alone may penalize densely developed communities that offer high levels of accessibility but not necessarily shorter travel times.

- *Measures Should Recognize That Reducing Congestion Is Impractical in Some Regions*—Some stakeholders suggested that measures should acknowledge that, in fast growing areas, the rate of congestion growth can only be slowed down, not reversed.

- *Some Measures May Favor Adding Road Capacity Over Non-Auto Solutions to Congestion*—Some stakeholders expressed concerns about measure approaches they think are more likely to encourage road capacity additions that

generate sprawl and are expensive to maintain, versus alternative solutions such as transit, carpools, bicycling, telework, or shifting work hours. Measurement approaches for which this concern was raised included measures that emphasize travel time per mile or vehicle speeds. Other stakeholders suggested that land use is a stronger influence on decisions to add road capacity than travel time or vehicle speeds.

- *Target Setting for Congestion Is Premature*—Some stakeholders suggested that system (congestion) performance measurement is one of the least mature and least robust measurement areas in transportation and that developing consistent data sets and understanding the patterns, causes, and trends in congestion is more important than establishing targets. Stakeholders suggested that a set of realistic performance targets should be determined locally (State and region) only after trend data and explanatory variables have been collected, analyzed, and made available for multiple years, thus creating a transition period or phased implementation of congestion related MAP-21 performance measurements.

- *System-wide Measures Do Not Support Project-Level Decisionmaking*—Some stakeholders expressed concern that national-level measures of performance are not sufficient to guide specific investments because they are not sensitive enough to capture the results of specific strategies and projects.

#### 2. Summary of Viewpoints Received for Subpart F: National Performance Management Measures To Assess Freight Movement on the Interstate System

Freight movement is multidimensional and includes a variety of public and private stakeholders with unique perspectives. In addition to the public participation and stakeholder consultation described in Section III.A., of this NPRM, DOT held listening sessions with representatives of the freight stakeholder community from the private and public sectors. Outreach to stakeholders through these sessions provided valuable information for FHWA to consider in developing the proposed measures. The major themes collected from each session and relevant academic research are detailed below.

##### Freight Roundtable

The FHWA held a Freight Roundtable event that brought together membership of the Freight Policy Council, a group of the executive leadership in each



operating administration at DOT, with multimodal industrial representatives and State and local leaders. Discussion was focused on freight planning and performance measurement. Panelists representing the freight community provided insights into both planning and measurement practices, issues, needs, and opportunities. Major themes of the subsequent discussion focused on multimodal measurements including reliability, trip time, access, safety, accident recovery, and economic measures. Predominant measure suggestions included reliability and travel time, which were described by a majority of attendees as the most valuable to the freight system user in the movement of goods.

#### State-Level Stakeholders

The FHWA held a listening session for State-level stakeholder organizations as these organizations have followed MAP-21's development and DOT's implementation activities and will have responsibility for reporting on the measures. These State-level stakeholders have advocated transportation-related policies and developed a significant amount of transportation research and findings that have contributed to the performance measure discussions surrounding MAP-21 implementation. Their suggestions included measures such as travel time, reliability, and bottleneck identification. Specifically, participants described travel time, reliability and speed as important to understand economic efficiency. Concern was expressed regarding data collection, cost, and burden to the States. Additionally, participants noted concern about external factors that are harder to measure or consider, as well as a lack of control over measures for safety or economics, where States do not want to be evaluated because they have little control in how to influence the measure. There was some discussion on targets and thresholds, noting that measuring speed and travel time against posted speed would be challenging due to regulators on trucks that limit speed, and variations in external factors would need to be considered by States in setting targets.

In addition to the listening session, the American Association of State Highway and Transportation Officials (AASHTO) performed a comprehensive analysis of the MAP-21 provisions and wrote a letter that contained recommendations approved by their membership for the MAP-21 Performance Measure Rulemaking. Other stakeholders and individuals provided recommendations as well.

These letters are all posted on the docket for review. For freight movement on the Interstate, these recommendations included the following:

- National level performance measures may not be the same performance measures State DOTs would use for planning and programming of transportation projects and funding.
- National level performance measures should be specific, measurable, attainable, realistic, timely, and simple.
- National level performance measures should focus on areas and assets where State DOTs have control.
- The initial set of national-level performance measures should build upon existing performance measures, management practices, data sets, and reporting processes.
- National level measures should be forward thinking to allow continued improvement over time.
- Messaging the impact and meaning of the national-level measures to the public and other audiences is vital to the success of this initiative.
- Flexibility in target setting to allow States to set their own thresholds and targets.

#### Metropolitan Planning Organizations and Other Regional Organizations

Like State-level stakeholders, MPO and regional organization freight representatives provided input in the MAP-21 outreach process for freight movement on the Interstate performance measures. In a listening session held with these representatives, key themes were consideration of hours of service for truck operators, economic efficiency, job creation measures, environmental measures, congestion, travel speed, and reliability. These stakeholders also identified information from shippers as necessary for interpreting the user perspective. Representatives supported travel time and reliability as most critical for measurement and indicated that these measures were most important for businesses in their regions.

Additional regional organization stakeholders, representing both urban and rural areas, further called for consistency in the adoption of measures that could best describe the freight system while considering differences in mode, geography, locations of freight facilities, and practices. Additional concerns were related to how to adapt freight performance measures to current measures that may not provide the correct picture of freight movement even though they are good measures for

passenger transport or some other function. Finally, representatives supported measures that identified reliability and the refinement and use of data for measuring reliability on freight corridors.

#### Trucking Industry and Freight Business Stakeholders

The FHWA held listening sessions with stakeholders representing a subset of the freight industry, primarily trucking, whose performance would be measured as part of this rule. These stakeholders represent various parts of the flow of goods from origin to destination and depend on the freight system for on-time deliveries of goods. More specifically, these stakeholders include professional truckers such as corporate drivers, owner-operators, and retired truckers, representatives of trucking companies, shippers, and related businesses.

The main comments received from these stakeholders related to truck parking, highway average speeds, bottlenecks, safety, oversize and overweight inconsistencies, tolls, and delay. Average speed was important to stakeholders because it provided drivers and industrial planners with the information they needed to plan routes and delivery schedules. Stakeholders identified reliability as important because it provides the driver with the flexibility to plan routes and deliveries by knowing what to expect at what time. One participant noted that it is very difficult for a driver to say that average speed is more important than travel time or reliability—this depends on time of day or where the driver needs to go. The participant gave examples where he could drive in and out of a metropolitan area without issue at one time of day but have significant delays at other times. Time of day and other external factors were said to be important when measuring performance.

Some shipper and business owner comments, as well as those of their own drivers, suggested that performance measures for freight include safety, travel time, hours of service, trends of delay, speeds, and connections to other modes or access. They said time was critical because travel times are useful in planning deliveries. Further, measuring trends of delay could help identify better opportunities for route plans. These stakeholders noted that bottlenecks, speed, and travel time information were important to measure and further, identified speed as a useful measure for determining bottlenecks.

In April 2013, FHWA sought clarification from stakeholders on

comments made during the listening sessions, specifically on measure thresholds and target setting. In subsequent outreach, the American Trucking Association, the Owner-Operator Independent Drivers Association, and AASHTO primarily reiterated previous comments that, in developing the measure, FHWA should balance the public and private perspective by providing flexibility to States for assessing freight movement and developing a measure that would be useful to the freight industry.

#### a. Stakeholders' Viewpoints on Measurement Approaches

Freight stakeholders provided diverse perspectives on approaches for assessing freight movement on the Interstate System including the use of measures based on accessibility, delay, speed, safety, parking availability, bottleneck identification, accident recovery, consistency in oversize/overweight vehicle practices, tolling practices, hours-of-service for truck operators, environmental impacts, and economic impacts. A common theme was the importance of speed, reliability, and travel time measures to freight system users because they can use this information to plan freight movements.

#### b. Stakeholders' Viewpoints on Measurement Challenges

Stakeholders provided input to DOT on the following perceived measurement challenges:

- *Avoid Additional Burden for Agencies*—Stakeholders expressed concern regarding the cost and burden to the States of freight data collection.
- *Lack of Control Over Performance Outcomes*—Some stakeholders noted concern about measuring and influencing external factors, such as safety and economic impacts, where agencies have little control over measure results.
- *Freight Measures are not the same as Broader System Performance Measures*—Some stakeholders expressed concern that broad system-level measures of performance may not adequately represent freight conditions.

#### c. Stakeholders' Viewpoints on Measurement Methods

Stakeholders provided input to DOT on detailed aspects of measure calculation methods. In general, stakeholders' suggestions fell within the following categories:

- *Use of "Posted Speed" in Performance Measures*—Some stakeholders noted that posted speed is not a satisfactory baseline for performance measures because of the

use of embedded governors or speed control devices companies install on trucks that limit speed and variations in other external factors.

- *Reliability Thresholds*—Stakeholders supported the use of a reliability measure as it is universally used and understood among transportation agencies and freight representatives. Reliability is often measured in the form of an index such as a Planning Time Index or Buffer Index, which both express a ratio of the worst travel time compared to a free flow, normal day, or average travel time. Freight stakeholders supported the numerator of a measurement index to be defined as the 95th percentile because it represents the higher degree of certainty for on-time arrival that freight stakeholders use in their route planning and deliveries. Understanding the gap between normal travel time and the 95th percentile will help to work toward operational and capital strategies that will improve reliability. Improving freight reliability is critical for freight stakeholders as it lessens transportation costs associated with delay. Travel times above a 95th percentile are usually attributed to unique and outlying circumstances, such as a major accident or event that significantly shuts down the roadway.

- *Measure Definitions*—Stakeholders mentioned research by the National Cooperation Highway Research Program (NCHRP), including NCHRP Report 20–24 (37)G Technical Guidance for Deploying National Level Performance Measures, that defines “average speed” as the average speed of trucks over a 24-hour period and “Reliability” as the ratio of the 95th percentile travel time to mean segment travel time.

#### d. Stakeholders' Viewpoints on Measurement Principles

Stakeholders provided DOT with some general principles for selecting measures. In general, stakeholders' suggestions fell within the following categories:

- *Flexibility in Measurement Approaches*—Some stakeholders suggested that national requirements for performance measurement should be flexible enough to allow for variation in regional and State geographic characteristics and modal options.
- *National Measures May Not Match State DOT's Measures*—National-level performance measures may not be the same performance measures State DOTs would use for planning and programming of transportation projects and funding.
- *Measures Should Address Issues that State DOTs Control*—National-level

performance measures should focus on areas and assets where State DOTs have control.

- *Measures Should Build on Past Experience*—Stakeholders emphasized that the initial set of national-level performance measures should build upon existing performance measures, management practices, data sets, and reporting processes.

- *Measures Should Allow Improvement Over Time*—Stakeholders suggested that national-level measures should be forward thinking to allow continued improvement over time.

- *Measures Should be Accompanied by Communication*—Stakeholders suggested that messaging the impact and meaning of the national-level measures to the public and other audiences is vital to the success of this initiative.

- *Flexibility in Target Setting*—Stakeholders suggested that there should be flexibility in target setting to allow States to establish their own thresholds and targets.

- *Specificity, Simplicity, and other General Characteristics*—Stakeholders advocated for specific, measurable, attainable, realistic, and timely national level performance measures. Additionally, stakeholders advocated for simplicity, arguing that measures should be simple and easy to understand.

#### 3. Summary of Viewpoints Received for Subpart H: National Performance Management Measures for the Congestion Mitigation and Air Quality Improvement Program—On-Road Mobile Source Emissions

Stakeholders provided DOT with input on data collection and reporting related to on-road mobile source emissions. Suggestions generally fell in the following categories:

- *Consistency with Current CMAQ Reporting Requirements and Practices*—Some stakeholders suggested that on-road mobile source emissions measures should be consistent with current CMAQ program reporting requirements and practices because quantification of CMAQ project-related emissions reductions is already required under 23 U.S.C. 149. Stakeholders emphasized that any new performance data and reporting should be consistent with and build upon current practice.
- *Avoid Imposing Burdens on Areas in Attainment*—Some stakeholders suggested new measures should not burden those parts of the country with monitoring when none is required by the Clean Air Act (CAA). It was noted that States without nonattainment areas are exempt from the burden of developing sophisticated emissions

analysis tools and should not be required to do so going forward.

- *Geographic Applicability of Reporting*—Some stakeholders suggested that emissions reporting should be limited solely to large urbanized areas where air quality planning efforts are focused and most CMAQ funding is directed. Other stakeholders suggested reporting also should include small urban areas.
- *Emissions Reporting Methods*—Stakeholders suggested various analytic and empirical methods for performance measurement:
  - Consistency with EPA or California Emissions Models*—Performance measures should be consistent with emissions modeling tools developed by EPA (Motor Vehicle Emission Simulator—MOVES)<sup>6</sup> and the California Air Resources Board (EMFAC).<sup>7</sup>
  - Applicability of EPA-recommended Sustainable Transportation Measures*—The EPA’s “Guide to Sustainable Transportation Performance Measures” is a helpful resource for developing on-road mobile source emission reporting approaches.
  - Applicability of Envision Tomorrow ArcGIS Tool*—Envision Tomorrow,<sup>8</sup> which is an extension for ArcGIS, could be a helpful tool for creating land-use scenarios and assessing their environmental and other impacts.
  - Region-specific Fleet Information*—MPOs may wish to consider using region specific fleet mix information when calculating emissions.
  - *Agency Emissions Data Capabilities*—Some stakeholders cautioned that State DOTs and MPOs vary in their capabilities to collect, replicate, and report data on an annual basis.
  - *Emissions Reporting should Include Greenhouse Gases*—It was suggested that greenhouse gas (GHG) emissions be tracked since GHGs are correlated with fuel use and air toxins.

#### IV. Rulemaking Authority and Background

The cornerstone of MAP–21’s Federal-aid highway program transformation is the transition to a performance and outcome-based program. As part of this transformation, and for the first time, recipients of Federal-aid highway funds make transportation investments to achieve individual targets that collectively make progress toward national goals.

The MAP–21 provisions that focus on the achievement of performance outcomes are contained in a number of sections of the law that are administered by different DOT agencies. Consequently, these provisions require an implementation approach that includes a number of separate but related rulemakings, some from other modes within DOT. A summary of the rulemakings related to this proposed rule is provided in this section and additional information regarding all related implementation actions is available on the FHWA Web site.<sup>9</sup>

##### A. Summary of Related Rulemakings

The DOT’s proposal regarding MAP–21’s performance requirements will be presented through several rulemakings. As a brief summary, these rulemaking actions are listed below and should be referenced for a complete picture of performance management implementation. The summary below describes the main provisions that DOT plans to propose for each rulemaking. The DOT has sought or plans to seek comment on each of these rulemakings.

1. First Federal-Aid Highway Performance Measure Rule (FR Vol.81 No.50),<sup>10</sup> Focused on Highway Safety
  - a. Propose and define national measures for the HSIP
  - b. State and MPO target establishment requirements for the Federal-aid highway program
  - c. Determination of significant progress toward the achievement of targets
  - d. Performance progress reporting requirements and timing

- e. Discuss how FHWA intends to implement MAP–21 performance-related provisions.

##### 2. Second Federal-Aid Highway Performance Measure Rule (RIN: 2125–AF53),<sup>11</sup> Focused on Highway Asset Conditions.

- a. Propose and define national measures for the condition of NHS pavements and bridges
- b. State and MPO target establishment requirements for the Federal-aid highway program
- c. Determination of significant progress toward the achievement of targets for NHPP
- d. Performance progress reporting requirements and timing
- e. Minimum standards for Interstate System pavement conditions.

##### 3. Third Federal-Aid Highway Performance Measure Rule, Focused on Assessing Performance of the NHS, Freight Movement on the Interstate System, and CMAQ (This NPRM)

- a. Propose and define national measures for the remaining areas under 23 U.S.C. 150(c) that require measures and are not discussed under the first and second measure rules, which includes the following: National Performance Measures for Performance of the Interstate System and non-Interstate National Highway System; CMAQ—Traffic Congestion; CMAQ—On-Road Mobile Source Emissions; and Freight Movement on the Interstate System
- b. State and MPO target establishment requirements for the Federal-aid highway program
- c. Performance progress reporting requirements and timing
- d. Determination of significant progress toward the achievement of targets for NHFP as well as the NHPP
- e. Provide a summary of all three performance measures rules (Table 2 below lists all proposed measures and the entire Part 490 is in the docket).

TABLE 2—SUMMARY OF RULEMAKINGS TO IMPLEMENT THE NATIONAL PERFORMANCE MANAGEMENT MEASURE RULES

Rulemaking	23 CFR Part 490 section	Proposed performance measure	Measure applicability
Safety PM Final Rule .....	490.207(a)(1) ....	Number of fatalities .....	All public roads.
Safety PM Final Rule .....	490.207(a)(2) ....	Rate of fatalities .....	All public roads.
Safety PM Final Rule .....	490.207(a)(3) ....	Number of serious injuries .....	All public roads.

<sup>6</sup> Motor Vehicle Emission Simulator—MOVES: <http://www.epa.gov/otaq/models/moves/index.htm>.

<sup>7</sup> California Air Resources Board (EMFAC): [http://www.arb.ca.gov/msei/categories.htm#onroad\\_motor\\_vehicles](http://www.arb.ca.gov/msei/categories.htm#onroad_motor_vehicles).

<sup>8</sup> Envision Tomorrow: <http://www.envisiontomorrow.org/about-envision-tomorrow/>.

<sup>9</sup> <http://www.fhwa.dot.gov/map21/qandas/qapm.cfm>.

<sup>10</sup> National Performance Management Measures; Highway Safety Improvement Program, 81 FR 13882 (Published on March 15, 2016) (codified at 23 CFR part 490).

<sup>11</sup> National Performance Management Measures Assessing Pavement Condition for the National Highway Performance Program and Bridge Condition for the National Highway Performance Program, 80 FR 325 (proposed January 5, 2015) (to be codified at 23 CFR part 490).



TABLE 2—SUMMARY OF RULEMAKINGS TO IMPLEMENT THE NATIONAL PERFORMANCE MANAGEMENT MEASURE RULES—  
 Continued

Rulemaking	23 CFR Part 490 section	Proposed performance measure	Measure applicability
Safety PM Final Rule .....	490.207(a)(4) ....	Rate of serious injuries .....	All public roads.
Safety PM Final Rule .....	490.207(a)(5) ....	Number of non-motorized fatalities and non-motorized serious injuries.	All public roads.
Infrastructure PM NPRM	490.307(a) .....	Percentage of pavements of the Interstate System in Good condition.	The Interstate System.
Infrastructure PM NPRM	490.307(a)(2) ....	Percentage of pavements of the Interstate System in in Poor condition.	The Interstate System.
Infrastructure PM NPRM	490.307(a)(3) ....	Percentage of pavements of the non-Interstate NHS in Good condition.	The non-Interstate NHS.
Infrastructure PM NPRM	490.307(a)(4) ....	Percentage of pavements of the non-Interstate NHS in Poor condition.	The non-Interstate NHS.
Infrastructure PM NPRM	490.407(c)(1) ....	Percentage of NHS bridges classified as in Good condition.	NHS.
Infrastructure PM NPRM	490.407(c)(2) ....	Percentage of NHS bridges classified as in Poor condition.	NHS.
System Performance PM NPRM.	490.507(a)(1) ....	Percent of the Interstate System providing for Reliable Travel.	The Interstate System.
System Performance PM NPRM.	490.507(a)(2) ....	Percent of the non-Interstate NHS providing for Reliable Travel.	The non-Interstate NHS.
System Performance PM NPRM.	490.507(b)(1) ....	Percent of the Interstate System where peak hour travel times meet expectations.	The Interstate System in urbanized areas with a population over 1 million.
System Performance PM NPRM.	490.507(b)(2) ....	Percent of the non-Interstate NHS where peak hour travel times meet expectations.	The non-Interstate NHS in urbanized areas with a population over 1 million.
System Performance PM NPRM.	490.607(a) .....	Percent of the Interstate System Mileage providing for Reliable Truck Travel Time.	The Interstate System.
System Performance PM NPRM.	490.607(b) .....	Percent of the Interstate System Mileage Uncongested.	The Interstate System.
System Performance PM NPRM: CMAQ –traffic congestion.	490.707 .....	Annual Hours of Excessive Delay Per Capita ...	The NHS in urbanized areas with a population over 1 million in nonattainment or maintenance for any of the criteria pollutants under the CMAQ program.
System Performance PM NPRM: CMAQ—On-road mobile source emissions.	490.807 .....	Total tons of emissions reduced from CMAQ projects for applicable criteria pollutants and precursors.	Projects financed with CMAQ funds in all non-attainment and maintenance areas for one or more of the criteria pollutants under the CMAQ program.

4. Update to the Metropolitan and Statewide Planning Regulations (RIN: 2125–AF52) <sup>12</sup>
- a. Supporting national goals in the scope of the planning process
  - b. Coordination between States, MPOs, and public transportation providers in selecting FHWA and public transportation performance targets
  - c. Integration of elements of other performance-based plans into the metropolitan and statewide planning process
  - d. Discussion in Metropolitan and Statewide Transportation Improvement Programs section documenting how the programs are designed to achieve targets
  - e. New performance reporting requirements in the Metropolitan transportation plan.

5. Updates to the Highway Safety Improvement Program Regulations (FR Vol.81 No.50) <sup>13</sup>
- a. Integration of performance measures and targets into the HSIP
  - b. Strategic Highway Safety Plan (SHSP) updates
  - c. Establishment of Model Inventory of Roadway Element Fundamental Data Elements
  - d. HSIP reporting requirements.
6. Federal-Aid Highway Asset Management Plan Rule (RIN: 2125–AF57) <sup>14</sup>
- a. Contents of asset management plan
  - b. Certification of process to develop plan
  - c. Transition period to develop plan
  - d. Minimum standards for pavement and bridge management systems.

7. Transit State of Good Repair Rule (RIN: 2132–AB20) <sup>15</sup>
- a. Define state of good repair and establish measures
  - b. Transit asset management plan content and reporting requirements
  - c. Target establishment requirements for public transportation agencies and MPOs.
8. Transit Safety Plan Rule (RIN: 2132–AB20) <sup>16</sup>
- a. Define transit safety standards
  - b. Transit safety plan content and reporting requirements.

<sup>12</sup> Statewide and Nonmetropolitan Transportation Planning; Metropolitan Transportation Planning, 79 FR 31784 (proposed June 2, 2014) (to be codified at 23 CFR part 450).

<sup>13</sup> Highway Safety Improvement Program, 81 FR 13722 (published on March 15, 2016).

<sup>14</sup> Asset Management Plan, 80 FR 9231 (proposed on February, 20, 2015)(to be codified at 23 CFR part 515).

<sup>15</sup> The FTA published their Advance Notice of Proposed Rulemaking (ANPRM) that incorporated items 7 and 8, on October 3, 2013. This ANPRM may be found at: <http://www.gpo.gov/fdsys/pkg/FR-2013-10-03/pdf/2013-23921.pdf>

<sup>16</sup> Ibid.

9. Highway Safety Grant Programs Rule (National Highway Traffic Safety Administration (NHTSA) Interim Final Rule<sup>17</sup> (IFR), RIN: 2127-AL30, 2127-AL29)

- a. Highway Safety Plan (HSP) contents, including establishment of performance measures, targets, and reporting requirements
- b. Review and approval of HSPs.

#### *B. Organization of MAP-21 Performance-Related Provisions*

The FHWA organized the many performance-related provisions within MAP-21 into six elements as defined below:

- *National Goals*—Goals or program purpose established in MAP-21 to focus the Federal-aid highway program on specific areas of performance.
- *Measures*—Establishment of measures by FHWA to assess performance and condition in order to carry out performance-based Federal-aid highway programs.
- *Targets*—Establishment of targets by recipients of Federal-aid highway funding for each of the measures to document expectations of future performance.
- *Plans*—Development of strategic and/or tactical plans by recipients of Federal-aid highway funding to identify strategies and investments that will address performance needs.
- *Reports*—Development of reports by recipients of Federal funding that would document progress toward the achievement of targets, including the effectiveness of Federal-aid highway investments.
- *Accountability*—Requirements developed by FHWA for recipients of Federal funding to use to achieve or make significant progress for targets established for performance.

The following provides a summary of MAP-21 provisions, as they relate to the six elements listed above, including a reference to other related rulemakings that should be considered for a more comprehensive view of MAP-21 performance management implementation.

#### 1. National Goals

The MAP-21 sec. 1203 establishes national goals to focus the Federal-aid highway program. The following national goals are codified at 23 U.S.C. 150(b):

- *Safety*—To achieve a significant reduction in traffic fatalities and serious

injuries on all public roads, including non-State owned public roads and roads on tribal lands.

- *Infrastructure condition*—To maintain the highway infrastructure asset system in a state of good repair.
- *Congestion reduction*—To achieve a significant reduction in congestion on the NHS.
- *System reliability*—To improve the efficiency of the surface transportation system.
- *Freight movement and economic vitality*—To improve the national freight network, strengthen the ability of rural communities to access national and international trade markets, and support regional economic development.
- *Environmental sustainability*—To enhance the performance of the transportation system while protecting and enhancing the natural environment.
- *Reduced project delivery delays*—To reduce project costs, promote jobs and the economy, and expedite the movement of people and goods by accelerating project completion through eliminating delays in the project development and delivery process, including reducing regulatory burdens and improving agencies' work practices.

These national goals will largely be supported through the metropolitan and statewide planning process, which is discussed under a separate rulemaking (RIN: 2125-AF52) to update the Metropolitan and Statewide Planning Regulations at 23 CFR part 450.

#### 2. Measures

The MAP-21 requires the establishment of performance measures, in consultation with State DOTs, MPOs, and other stakeholders, that would do the following:

- Carry out the NHPP and assess the condition of pavements on the Interstate System and the NHS (excluding the Interstate System), the condition of bridges on the NHS, and performance of the Interstate System and NHS (excluding the Interstate System);
- Carry out the HSIP and assess serious injuries and fatalities per VMT and the number of serious injuries and fatalities;
- Carry out the CMAQ program and assess traffic congestion and on-road mobile source emissions; and
- Assess freight movement on the Interstate System.

The MAP-21 also requires the Secretary to establish the data elements necessary to collect and maintain standardized data to carry out a performance-based approach.<sup>18</sup>

The FHWA proposed to issue three rulemakings in sequence to implement

the measures for the areas listed above. The first rulemaking, issued as a NPRM on March 11, 2014 and published as a final rule on March 15, 2016, focused on the performance measures, for the purpose of carrying out the HSIP, to assess the number of serious injuries and fatalities and serious injuries and fatalities per VMT. The second NPRM focused on the measures to assess the condition of pavements and bridges, and this third NPRM proposes measures for the remaining areas under 23 U.S.C. 150(c).

The FHWA had proposed in the prior performance management NPRMs to establish one common effective date for its three performance measure final rules. While FHWA recognizes that one common effective date could be easier for State DOTs and MPOs to implement, the process to develop and implement all of the Federal-aid highway performance measures required in MAP-21 has been lengthy. It is taking more than 3 years since the enactment of MAP-21 to issue all three performance measure NPRMs (the first performance management NPRM was published on March 11, 2014; the second NPRM was published on January 5, 2015). Rather than waiting for all three rules to be final before implementing the MAP-21 performance measure requirements, FHWA has decided to phase in the effective dates for the three final rules for these performance measures so that each of the three performance measures rules will have individual effective dates. This allows FHWA and State DOTs to begin implementing some of the performance requirements much sooner than waiting for the rulemaking process to be complete for all the rules. The FHWA believes that individual implementation dates will also help State DOTs transition to performance based planning.

On March 15, 2016, FHWA published a final rule (FR Vol. 81 No. 50) covering the safety-related elements of the Federal-aid Highway Performance Measures Rulemaking. With the staggered effective dates, the Rule will be implemented in its entirety before the other two rules are finalized.

Based on the timing of each individual rulemaking, FHWA would provide additional guidance to stakeholders on how to best integrate the new requirements into their existing processes. Under this approach, FHWA expects that even though the implementation for each rule would occur as each final rule is published, implementation for the second rule would ultimately be aligned with the third rule through a common

<sup>17</sup> 23 U.S.C. 402(k); Uniform Procedures for State Highway Grant Programs, Interim Final Rule, 78 FR 4986 (Jan. 23, 2013) (to be codified at 23 CFR part 1200).

<sup>18</sup> 23 U.S.C. 150(c)(1)

performance period. In the second performance management measure NPRM, FHWA proposed that the first 4-year performance period would start on January 1, 2016. However, FHWA proposes in this NPRM that the first performance period would begin on January 1, 2018. This would align the performance periods and reporting requirements for the proposed measures in the second and third performance management measure NPRMs. The FHWA has placed on the docket a timeline that illustrates how this transition could be implemented. However, FHWA seeks comment from the public on what an appropriate effective date(s) could be. Additional information on the approach to establish performance measures for the Federal-aid highway program can be found on FHWA's Transportation Performance Management Web site.<sup>19</sup>

The MAP-21 also requires FHWA to establish minimum levels for the condition of pavements for the Interstate System necessary to carry out the NHPP, which was proposed in the second rulemaking.<sup>20</sup> In addition, MAP-21 also requires FHWA to establish minimum standards for State DOTs to use in developing and operating bridge and pavement management systems, which FHWA proposed in a separate rulemaking to establish an Asset Management Plan (RIN 2125-AF57) for the NHS.<sup>21</sup>

Separate sections of MAP-21 require the establishment of additional measures to assess public transportation performance.<sup>22</sup> These measures, which would be used to monitor the state of good repair of transit facilities and to establish transit safety criteria, would be addressed in two separate rulemakings led by Federal Transit Administration (FTA).

In regard to the Federal Lands Transportation Program, FHWA anticipates working with eligible Federal entities to establish performance measures.

### 3. Targets

The MAP-21 requires State DOTs to establish performance targets reflecting measures established for the Federal-aid highway program<sup>23</sup> and requires MPOs to establish performance targets for these measures where applicable.<sup>24</sup> The first NPRM proposed the process for State DOTs and MPOs to follow in the

establishment of safety performance targets, and was published as a final rule on March 15, 2016. The second NPRM and the third Federal-aid highway measure NPRM discusses similar target establishment requirements for State DOTs and MPOs as they relate to the measures discussed in the respective proposed rules. Additionally, State DOTs and MPOs are required to coordinate when selecting targets for the areas specified under 23 U.S.C. 150(c) in order to ensure consistency in the establishment of targets, to the maximum extent practical.<sup>25</sup> A separate rulemaking to update the Metropolitan and Statewide Planning Regulations (RIN 2125-AF52) at 23 CFR 450 discusses this coordination requirement.

Further, MAP-21 requires State Highway Safety Offices to establish targets for 11 core highway safety program outcome measures in the State HSP, which NHTSA has implemented through an Interim Final Rule,<sup>26</sup> and for recipients of public transportation Federal funding and MPOs to establish state of good repair and safety targets.<sup>27</sup> Discussions on these target establishment requirements are not included in this NPRM. Rather, DOT will discuss those target establishment requirements in the subsequent rulemakings to implement these respective provisions.

### 4. Plans

A number of provisions within MAP-21 require States and MPOs to develop plans that provide strategic direction for addressing performance needs. For the Federal-aid highway program these provisions require: State DOTs to develop an Asset Management Plan;<sup>28</sup> State DOTs to update their SHSP;<sup>29</sup> MPOs serving large TMAs in areas of nonattainment or maintenance to develop a CMAQ Performance Plan;<sup>30</sup> MPOs to include a System Performance Report in the Metropolitan Transportation Plan;<sup>31</sup> and State DOTs and MPOs to include a discussion, to the maximum extent practical, in their Transportation Improvement Program

(TIP) as to how the program would achieve the performance targets they have established for the area.<sup>32</sup> In addition, State DOTs are encouraged to develop a State Freight Plan<sup>33</sup> to document planned activities and investments with respect to freight. This rulemaking does not discuss any requirements to develop or how to use these plans, with the exception of some discussion of the CMAQ Performance Plan. Rather, a discussion on the development and use of these plans will be included in the respective rulemakings or guidance to implement these provisions. More information on the required plans and the actions to implement the statutory provisions related to plans can be found on FHWA's MAP-21 Web site.<sup>34</sup>

### 5. Reports

The MAP-21 sec. 1203 requires State DOTs to submit biennial reports to FHWA on the condition and performance of the NHS, the effectiveness of the investment strategy documented in a State DOT's asset management plan for the NHS, progress in achieving targets, and ways in which a State DOT is addressing congestion at freight bottlenecks.<sup>35</sup> The FHWA proposed in the first NPRM that safety progress be reported by State DOTs through the HSIP annual report and not in the biennial report required under 23 U.S.C. 150(e). This NPRM, under Subpart A, discusses the 23 U.S.C. 150(e) biennial reporting requirement. The 23 U.S.C. 150(e) biennial reporting requirement would apply to all of the non-safety measures for the Federal-aid highway program (*i.e.*, the measures proposed in this NPRM and in the second Performance Measure NPRM).

Additional progress reporting is required under the CMAQ program, Metropolitan transportation planning, elements of the Public Transportation Act of 2012, and the Motor Vehicle and Highway Safety Improvement Act of 2012. Also, State DOTs should include a system performance report in their statewide transportation plan. These reporting provisions are discussed in separate rulemakings and guidance and are not discussed in this rulemaking, with the exception of some reporting required by MPOs as part of the CMAQ program.

<sup>19</sup> <http://www.fhwa.dot.gov/tpm/about/schedule.cfm>.

<sup>20</sup> 23 U.S.C. 150(c)(3)(A)(iii).

<sup>21</sup> 23 U.S.C. 150(c)(3)(A)(i).

<sup>22</sup> 49 U.S.C. 5326 and 49 U.S.C. 5329.

<sup>23</sup> 23 U.S.C. 150(d).

<sup>24</sup> 23 U.S.C. 134(h)(2)(B).

<sup>25</sup> 23 U.S.C. 134(h)(2), 23 U.S.C. 135(d)(2), 49 U.S.C. 5303(h)(2), and 49 U.S.C. 5304(d)(2).

<sup>26</sup> 23 U.S.C. 402(k); Uniform Procedures for State Highway Safety Grant Programs, Interim final rule, 78 FR 4986 (January 23, 2013) (to be codified at 23 CFR part 1200). An eleventh core outcome measure for bicycle fatalities was added after the publication of the Interim Final Rule and is available at <http://www.ghsa.org/html/resources/planning/index.html>.

<sup>27</sup> 49 U.S.C. 5326(c) and 5329.

<sup>28</sup> 23 U.S.C. 119(e)(2).

<sup>29</sup> 23 U.S.C. 148(d).

<sup>30</sup> 23 U.S.C. 149(l).

<sup>31</sup> 23 U.S.C. 134(i)(2)(C).

<sup>32</sup> 23 U.S.C. 134(j)(2)(D) and 23 U.S.C. 135(g)(4).

<sup>33</sup> MAP-21, sec. 1118.

<sup>34</sup> <http://www.fhwa.dot.gov/map21/qandas/qapm.cfm>.

<sup>35</sup> 23 U.S.C. 150(e).



## 6. Accountability

Two provisions within MAP–21, specifically 23 U.S.C. 119(e)(7) under the NHPP and 23 U.S.C. 148(i) under the HSIP, and one provision within FAST Act (Section 1116 codified at 23 U.S.C. 167(j)) under NHFP require the State DOT to undertake actions if significant progress is not made toward the achievement of State DOT targets established for these respective programs. The FAST Act Section 1406 modified the NHPP significant progress language and added language for the NHFP. Accordingly, for NHPP and NHFP, if the State DOT has not achieved or made significant progress toward the achievement of applicable targets in a single FHWA biennial determination, then the State DOT must document in its next biennial report the actions it will take to achieve the targets.

Please note that FHWA proposes in section 490.109(e) that FHWA would consider a State DOT has made significant progress toward the achievement of an NHPP or NHFP target when either: (1) The actual condition/performance level is equal to or better than the State DOT established target; (2) or the actual condition/performance is better than the State DOT identified baseline of condition/performance. So the term “achieved or made significant progress” is synonymous with the term “made significant progress” throughout this NPRM. This provision is discussed in the second performance measure NPRM and in this NPRM.

For the HSIP, if the State DOT does not achieve or make significant progress for its HSIP safety targets, then the State DOT must dedicate a specified amount of obligation limitation to safety projects and prepare an annual implementation plan.<sup>36</sup> The first performance measure NPRM discussed this provision, and it is codified in the final rule that covers the safety-related elements of the Federal-aid Highway Performance Measures Rulemaking published on March 15, 2016.

In addition, MAP–21 requires that each State DOT maintain a minimum condition level for Interstate System pavement and NHS bridge conditions. If a State DOT falls below either standard, then the State DOT must spend a specified portion of its funds for that purpose until the minimum standard is exceeded.<sup>37</sup> This provision was discussed in the second performance measure NPRM, which proposed

pavement and bridge performance measures for the NHS.

The FHWA recognizes that there is a limit to the direct impact that State DOTs can have on performance outcomes within the State and that State DOTs need to consider this uncertainty in their establishment of targets. The FHWA encourages State DOTs to consult with relevant entities (e.g., MPOs, local transportation agencies, Federal Land Management Agencies, tribal governments) as State DOTs establish targets, so they can better identify and consider factors outside of their direct control that could impact future condition/performance.

Further, MAP–21 includes special safety rules to require each State DOT to maintain or improve safety performance on high risk rural roads and for older drivers and pedestrians.<sup>38</sup> If the State DOT does not meet these special rules, which contain minimum performance standards, then it must dedicate a portion of HSIP funding (in the case of the high risk rural road special rule) or document in their SHSP actions it intends to take to improve performance (in the case of the older driver and pedestrian special rule). Guidance on how FHWA will administer these two special rules is provided on FHWA’s MAP–21 Web site.<sup>39</sup>

### C. Implementation of MAP–21 Performance Requirements

The FHWA will implement the performance requirements within section 1203 of MAP–21 in a manner that results in a transformation of the Federal-aid highway program so that the program focuses on national goals, provides for a greater level of accountability and transparency, and provides a means for the most efficient investment of Federal transportation funds. In this regard, FHWA plans to implement these new requirements in a manner that will provide Federal-aid highway fund recipients the greatest opportunity to fully embrace a performance-based approach to transportation investment decisionmaking that does not hinder performance improvement. In this regard, FHWA carefully considered the following principles in the development of proposed regulations for national performance measures under 23 U.S.C. 150(c):

- Provide for a National Focus—focus the performance requirements on

outcomes that can be reported at a national level.

- Minimize the Number of Measures—identify only the most necessary measures that will be required for target establishment and progress reporting. Limit the number of measures to one or no more than two per area specified under 23 U.S.C. 150(c).

- Ensure for Consistency—provide a sufficient level of consistency, nationally, in the establishment of measures, the process to establish targets and report expectations, and the approach to assess progress so that transportation performance can be presented in a credible manner at the national level.

- Phase in Requirements—allow for sufficient time to comply with new requirements and consider approaches to phase in new approaches to measuring, target establishment, and reporting performance.

- Increase Accountability and Transparency—consider an approach that would provide the public and decisionmakers a better understanding of Federal transportation investment returns and needs.

- Consider Risk—recognize that risks in the target establishment process are inherent and that many factors, outside the control of the entity required to establish the targets, can impact performance.

- Understand that Priorities Differ—recognize that targets need to be established across a wide range of performance areas and that performance trade-offs would need to be made to establish priorities, which would be influenced by local and regional needs.

- Recognize Fiscal Constraints—provide for an approach that encourages the optimal investment of Federal funds to maximize performance but recognize that, when operating with scarce resources, performance cannot always be improved.

- Provide for Flexibility—recognize that the MAP–21 requirements are the first steps that will transform the Federal-aid highway program to a performance-based program and that State DOTs, MPOs, and other stakeholders will be learning a great deal as implementation occurs.

The FHWA considered these principles in this and previous NPRMs and encourages comments on the extent to which the approach to performance measures set forth in this NPRM supports the principles discussed above.

### Federal Technical Assistance

The FHWA is committed to providing stewardship to State DOTs and MPOs assisting them as they take steps to

<sup>36</sup> 23 U.S.C. 148(i).

<sup>37</sup> 23 U.S.C. 119(f).

<sup>38</sup> 23 U.S.C. 148(g).

<sup>39</sup> <http://www.fhwa.dot.gov/map21/guidance/guidehrrr.cfm> and <http://www.fhwa.dot.gov/map21/guidance/guideolder.cfm>.

manage and improve the performance of the highway system. As a Federal agency, FHWA is in a unique position to utilize resources at a national level to capture and share strategies that can improve performance. The FHWA is prepared to dedicate resources at the national level to provide on-site assistance, technical tools and guidance to State DOTs and MPOs to assist them in making more effective investment decisions. It is FHWA's intent to be engaged at a local and national level to provide resources and assistance from the onset to identify opportunities to improve performance and to increase the chances for full State DOT and MPO compliance of new performance related regulations. The FHWA technical assistance will include activities such as conducting national research studies, developing analytical modeling tools, identifying and promoting best practices, preparing guidance materials, and developing data quality assurance tools. The FHWA encourages comments on how it can help maximize opportunities for successful implementation.

#### V. Performance Management Measure Analysis

This section of the NPRM summarizes the process FHWA used to consider potential performance measures, including alternate data sources and potential measures. The FHWA's analysis was based on consideration of viewpoints from several sources including:

- Knowledge of technical experts within DOT and FHWA on the current state of practice for measuring system performance, freight movement, traffic congestion, and on-road mobile source emissions;
- Information provided by external stakeholders received directly or captured as part of organized stakeholder listening sessions;
- Information provided by external stakeholders received indirectly through informal contact such as telephone calls, email, or letters; and
- Measures that have been recommended and documented in nationally recognized reports such as the assessment of measurement readiness documented in the 2011 final report for NCHRP Project 20–24(37)G, “Technical Guidance for Deploying National Level Performance Measurements.”

Compared with the two previous NPRMs in this series, the measurement areas covered by this NPRM are more varied from State to State; consequently, stakeholders' consensus about approaches for measuring performance

is inconsistent. To aid its analysis of alternate measurement options for this NPRM specifically, FHWA relied on an expanded set of qualitative criteria (which supplement the assessment factors/criteria utilized in the other performance measure NPRMs) to ensure that a set of measures established through this rulemaking would allow for:

- A national performance story to be communicated in a credible and reliable manner;
- State DOTs and MPOs to consider their unique expectations of desirable performance;
- The potential for use across multiple surface transportation modes;
- One core set of data to be used to assess system performance, traffic congestion, and freight movement; and
- The potential utilization of new data as technology progresses.

Section V includes three sub-sections, which describe FHWA's assessment of measures using the expanded set of criteria as well as the assessment factors and criteria used in the two previous performance measure NPRMs:

- Sub-Section A—Analysis and assessment of potential data sources, measurement methodologies, and proposed measures for measuring system performance and traffic congestion;
- Sub-Section B—Analysis and assessment of potential data sources, measurement methodologies, and proposed measures for measuring freight movement, and
- Sub-Section C—Analysis and assessment of potential data sources, measurement methodologies, and proposed measures for measuring on-road mobile source emissions.

Also, each sub-section below describes FHWA's evaluation of the measures using a common methodology to identify gaps that could impact successful implementation of proposed performance measures.

##### A. Selection of Measures for Subparts E and G—System Performance and Traffic Congestion

This sub-section describes FHWA's analysis of data types, sources, and measurement methods to support potential measures. We also include a brief history of, and lessons learned from, FHWA's research on congestion and reliability performance measures. Lastly, this sub-section describes FHWA's assessment of proposed measures including: (1) Percentage of system providing for reliable travel times; (2) percentage of system providing where peak hour travel times

meet expectations; and (3) annual excessive delay per capita.

##### System Performance and Traffic Congestion Data Types and Sources Considered by FHWA

The FHWA considered several potential data sources for use in measuring system performance and traffic congestion including travel speed and time data, travel volume data, vehicle throughput data, and other trip information on data.

*Travel Speed or Travel Time Data*—Many State DOTs, MPOs, local agencies, and travel corridor partnerships make use of vehicle speed and travel time data sets to manage system operations or report performance. The FHWA recognizes that travel time or speed does not provide information on the purpose of trip, trip origin and destination, transportation mode, or occupancy rates. However, FHWA has been working to advance the quality of this data. One way FHWA has done this is by acquiring and making available to State and local governments a national travel time data set, the NPMRDS, to support national, State, and local system performance and congestion reporting, research and analysis needs. At this time, FHWA finds that the NPMRDS is the only national travel speed and travel time data source available to State DOTs and MPOs that could reliably support all the performance reporting needs of this rulemaking.

*Traffic Volume Data*—All State DOTs report annual average daily traffic (AADT) for all Federal-aid eligible roadways to FHWA's HPMS database. All State DOTs also voluntarily provide monthly counts of AADT to FHWA, which FHWA uses to produce monthly national traffic volume trend information.<sup>40</sup> The FHWA believes, however, that traffic volume data offers an incomplete picture of either system performance or traffic congestion because it lacks information about traffic volume by specific times of the day, and because volume counts are based on information collected at a limited number of locations. As these weaknesses do affect the accuracy or value of volume counts, FHWA concluded that volume data would be a poor choice as the sole data source for measuring system performance or traffic congestion.

*Traffic Throughput Data*—Some researchers and practitioners have used data on the total number of vehicles or persons passing through a specific

<sup>40</sup> FHWA Traffic Volume Trends: [https://www.fhwa.dot.gov/policyinformation/travel\\_monitoring/tvt.cfm](https://www.fhwa.dot.gov/policyinformation/travel_monitoring/tvt.cfm).

location during a defined time period to measure system performance and/or traffic congestion. The FHWA believes that performance throughput data is not widely available at a national level nor is it routinely measured on a system-wide basis in States. However, we seek comment on the use and availability of performance throughput data.

To measure throughput on the NHS would require near constant vehicle count/volume data that does not exist today except for a very limited number of locations (usually those locations where HPMS requires reporting of volume). Person count data, which would be used for measuring person throughput, is typically based on vehicle occupancy which is typically reported as an average based on surveys (including the U.S. Census) or as a set multiplier to vehicles (e.g., 1.1

occupants per vehicle), although limited counts at single locations on roadways are often undertaken. Classification of vehicles data (for assigning person trips) is also available in a very limited number of locations and would be required for measuring the number of people in buses or vans, for example.

The FHWA concludes that an almost complete lack of data availability makes throughput data impractical as a measure of performance. The FHWA recognizes, however, that improvements in traffic data collection technologies could offer the potential to measure throughput on a system-wide basis in the future.

*Other/Trip Information*—The FHWA also considered various alternative data types related to trip characteristics that offer insights on system performance and traffic congestion such as typical

travel times, trip purpose, and trip origin and destination information. This data is generally collected using surveys, such as the American Community Survey, or regional travel surveys produced by MPOs that sample a statistically representative portion of all travelers. Although surveys of this kind can provide valuable information to help plan and manage transportation demand, FHWA believes the information captured could not easily be used to support a national performance measure because these surveys are administered infrequently and are not referenced to specific locations.

A summary of FHWA's analysis of the viability of various data types to support national measures to assess system performance and traffic congestion is provided in Table 3 below:

TABLE 3—SUMMARY ASSESSMENT OF DATA TYPES FOR USE IN SUPPORT OF NATIONAL MEASURES TO ASSESS SYSTEM PERFORMANCE AND TRAFFIC CONGESTION

Information source	National data source available?	Update frequency	Granularity	Considered for the proposed rule?
Speed or Travel Time .....	Yes .....	Monthly .....	Roadway segment .....	Yes.
Traffic Volume .....	Yes .....	Annual .....	Roadway segment .....	Yes.
Throughput .....	No .....	Varies .....	Specific Corridors .....	No.
Trip Information .....	Yes .....	Annual .....	Regional .....	No.

Based on the discussion in this section, FHWA considered use of travel time, speed, or traffic volume data to support measures for system performance and traffic congestion.

Request for comments: FHWA recognizes limitations in the availability of data could be resolved in the future with technology advancement. The FHWA seeks comments on potential data sources and technologies related to system performance and traffic congestion measures, including:

1. *Trip Information Data*: The FHWA is seeking comments on approaches for gathering travel, trip origin and destination, transportation mode, or occupancy rates information on a routine and system-wide basis.

2. *Throughput Data*: The FHWA is seeking comment on approaches for gathering throughput data for traffic congestion that would capture the total number of travelers passing through segments that make up a full system on a regular basis.

3. *Survey Data*: The FHWA recognizes that survey data available today offers only limited application to the development of performance measures; technologies available to capture large volumes of data on the movement of people could provide the potential to capture trip-related information that

could be useful in managing transportation performance. The FHWA is seeking comment on approaches that can be used to capture trip-related information on a more routine and system-wide basis.

#### System Performance and Traffic Congestion Measures Considered by FHWA

The FHWA identified and considered a variety of approaches to express travel time, speed, or traffic volume data as measures of system performance or traffic congestion including travel delay, a travel time index, travel time, travel time reliability, or Level of Service. A summary of how these suggestions and approaches were considered by FHWA is provided below:

*Travel Delay-Based Measure*—Delay is typically a corridor or system-level indicator of additional travel time or slower travel speed when compared to the desired time or the desired speed of travel; it is easily understood by transportation users and is meaningful, expressed in terms of lost time, for all modes of surface transportation. The FHWA finds that many operating agencies use delay metrics to report on and manage system performance; however, the definition of delay varies among agencies. The FHWA

acknowledges that delay measures do not capture system performance attributes in terms of shorter trips or better access to destinations and modal options, which may occur at the expense of greater delay. For example, transportation priorities in a region may focus on land use decisionmaking that concentrates populations, resulting in reduced speeds but improving access to destinations and modal options. The FHWA considered these concerns in the design of measures based on delay.

*Travel Time Index Measure*—A travel time index compares actual travel time for a road segment (typically during the peak period) relative to a reference travel time. The FHWA finds that travel time indices are widely used to report on and manage system performance and traffic congestion. As with delay metrics, FHWA acknowledges that travel time indices do not capture system attributes in terms of shorter trips or better access to destinations and mode options, which may occur at the expense of greater delay. Recognizing that a free-flow speed-based reference travel time may not support regional and local planning policies, FHWA believes it is appropriate for individual State DOTs and/or MPOs to establish reference travel times that support local priorities for certain types of measures.



The FHWA believes that the use of an index provides an effective means to normalize travel times so that the performance can be evaluated across different roadway segments and used to calculate a national performance measure.

**Travel Time-Based Measure**—A measure calculated using a travel time-based metric would report actual travel times for origin-destination pairs rather than comparing actual travel time to a reference travel time. The FHWA believes that use of travel time by itself as a metric or measure would be difficult for the public to understand without also knowing the associated origin-destination information. The FHWA believes that the use of an index that compares actual travel time to expected travel time is more meaningful to the public.

**Travel Time or Speed Reliability Measure**—This measure would compare the longest travel time or slowest speed that occurs during a specified time frame to a reference travel time or speed for a transportation facility. A reliability measure is an indication of the extra time a traveler must add to their trip in order to have a high degree of certainty

that they will arrive at their destination on time. The FHWA finds that travel time reliability measures are widely used to report on and manage system performance. The FHWA also notes two important refinements that strengthen travel time reliability measures: (1) Some agencies exclude the top 20 percent of longest travel times throughout the year because these travel times typically are due to extreme events that are beyond an agency's control and should not be considered in the assessment of overall system performance; and (2) The reference travel time used in a reliability measure often reflects travel time associated with typical or average travel speeds rather than the time associated with free flow travel speeds.

**Level of Service-Based Measure**—Some transportation agencies assess the performance of their highways by comparing existing traffic volume to the capacity for which those highways are designed in a measure that is typically referred to as the Level of Service. This approach assumes that as traffic volume reaches the capacity of the system, performance is reduced. However,

FHWA believes that an agency can often use operations strategies such as ramp metering or High Occupancy Vehicle lanes to avoid or reduce performance impacts as traffic volume approaches capacity. The FHWA also believes that data on traffic volume information is not sufficiently available on all segments of roadways at all times of the day to use as the only basis for the development of national performance measures.

**Impact-Based Measures**—Some transportation agencies and planning organizations use measures to report the estimated impacts of increased travel times or reduced travel speeds such as wasted fuel, the value of lost time, or commuter stress levels. The FHWA finds, however, that the information to support such measures is not directly measurable, thereby requiring the use of algorithms that would be difficult to develop in a reliable manner.

A summary of FHWA's analysis of the different approaches for expressing travel time, travel speed, and/or traffic volume considered as part of its efforts to develop measures to assess system performance and traffic congestion is provided in Table 4 below.

TABLE 4—SUMMARY OF ASSESSMENT OF APPROACHES FOR EXPRESSING TRAVEL TIME, TRAVEL SPEED, AND TRAFFIC VOLUME

Approach	Level of stakeholder interest	Considered for the proposed rule?	Considerations
Delay .....	Mixed .....	Yes.	Use of an agency defined threshold.
Travel Time as an Index .....	Low .....	Yes .....	
Travel Time .....	Mixed .....	No.	
Travel Time Speed Reliability .....	High .....	Yes .....	
Level of Service .....	Low .....	No.	Consider non-recurring congestion tied to extreme events.
Impacts .....	Very Low .....	No.	

#### FHWA Congestion and Reliability Performance Measure Research and Analysis

The FHWA has been researching performance measures for congestion, mobility, and reliability for over 10 years. The Urban Congestion Report<sup>41</sup> and Freight Performance Measurement (FPM)<sup>42</sup> have focused on producing performance measures from a variety of sources over the years. Initially, FHWA's research calculated travel times from speed data derived from sensors in or along the roadway, including loop detectors, side-fired radar detectors, video detection, etc. The FHWA research then developed a variety of measures that could be used for trend

analysis, such as the Planning Time Index (95th percentile travel time versus free flow travel time) that focuses on the variability (or reliability) of travel day to day, and hours of congestion (hours of day where travel on freeways is under 45 mph), among other measures. The measures were aggregated from roadway sections up to urbanized area-wide measure as well as national measures.

Two issues identified through this research are important to understanding the ultimate approach FHWA proposes for the MAP-21 performance measures related to congestion and system reliability. First, the advent of readily available vehicle-based probe travel time data in recent years has led to a transformation of traveler information and performance measure development. Vehicle-based probe travel time data is derived from in-vehicle, GPS-based

probes, including track fleet management devices, navigation units, and cell phones that report location information and time. The travel times are either derived directly from speed data provided or calculated based on a probe's trip progress (deriving speeds from the amount of time taken to travel between two locations and the distance between the two locations). Because data on the entire NHS is available from actual measurements tied to a date, time, and location on specific roadway segments, congestion performance measurement can be much more accurate, widespread, and detailed. This data also provides the potential to undertake before/after evaluations of transportation projects and strategies.

Since the passage of MAP-21, the FHWA acquired vehicle-based probe travel time data from a private vendor

<sup>41</sup> [http://ops.fhwa.dot.gov/perf\\_measurement/ucr/](http://ops.fhwa.dot.gov/perf_measurement/ucr/).

<sup>42</sup> [http://ops.fhwa.dot.gov/freight/freight\\_analysis/performance\\_meas/#fhwa](http://ops.fhwa.dot.gov/freight/freight_analysis/performance_meas/#fhwa).

for the entire NHS, and acquired the rights for State DOTs and MPOs to also use the data. The data set, the NPMRDS, delivers travel time data, averaged every 5 minutes of every day of the year every month. Travel times are reported for freight-only and for all traffic, which includes all probe data available (passenger, freight, fleet, taxis, etc.).

The second issue FHWA identified is that aggregating measures up to a national level provides important national trend information but has limited direct correlation to how money is being spent on road improvements that may actually affect changes in the measure. The FHWA has been advocating the use of performance measures at a local level as best practice in recent years. Operating and planning agencies can better understand how a project affects performance on a section of roadway or how a facility or corridor operates during peak periods or weather events using local performance measures, rather than aggregating measure up to a regional, State, or national level.

#### Applicability of Measures

The FHWA analysis of measures included applicability of measures to the transportation network or geographic area. Section 1203 of MAP-21 directed FHWA to establish measures for States to use to assess the performance of the Interstate System and the non-Interstate NHS. For assessing performance of the non-Interstate NHS, FHWA believes it is important that at least one of the selected measures relate to the entire NHS. Since system reliability is identified as one of the National Goals (23 U.S.C. 150(b)(4)), FHWA decided it was appropriate to establish a reliability-based measure for the entire NHS. Accordingly, the NHPP Performance of the System reliability measure is calculated for the entire NHS.

Another important component of System Performance is congestion, and typically, but not exclusively, the worst congestion occurs on high-volume roads in urbanized areas. The FHWA thought it was important to capture this type of congestion in a measure so that urbanized areas would be able to monitor and address congestion issues. The Peak Hour Travel Time measure was developed to provide this information, limiting the reporting to the largest urbanized areas (over 1,000,000 in population). In selecting this measure, FHWA considered the national goal of congestion reduction, which asks to achieve a significant reduction in congestion on the NHS. 23

U.S.C. 150(b)(3). The FHWA believes the Peak Hour Travel Time measure is consistent with this national goal. The Peak Hour Travel Time measure also gives agencies in the affected urbanized areas the ability to relate their measure to their NHS roadway operational and investment policies by allowing them to set the “Desired Peak Period Travel Time” on their NHS roadways.

Consistent with the purpose of the CMAQ program to fund transportation projects and programs that will contribute to attainment or maintenance of the NAAQS in areas designated as nonattainment and maintenance, FHWA believes that the CMAQ Traffic Congestion measure should apply to nonattainment and maintenance areas and relate to the goals of the CMAQ Program (to improve air quality and relieve congestion). To reduce the burden on some States DOTs and MPOs and to focus on areas where typically the worst congestion occurs, like the System Performance congestion measure, FHWA chose to limit this measure to urbanized areas over 1,000,000 in population as well, since those agencies typically have more capability and experience in assessing traffic congestion. In addition, these areas are the same areas where MPOs will need to report on the CMAQ measures as part of a performance plan under 23 U.S.C. 149(l). Similar to the System Performance congestion measure, FHWA also chose a measure that would be consistent with the national goal of congestion reduction.

Based on a thorough review of data, measure definitions, calculation methods, applicability, and national goals, FHWA identified three potential measures to assess system performance and traffic congestion that deserved further consideration including: Percentage of system providing for reliable travel times; percentage of system where peak hour travel times meet expectations; and annual excessive delay per capita.

The FHWA analyzed these proposed measures for system performance and traffic congestion in tandem as part of this rulemaking so they would provide (1) a complete national picture of system reliability; (2) a focus on urbanized area peak hour congestion; and (3) a focus on the worst traffic delays in air quality nonattainment areas and maintenance areas. In addition, FHWA ensured that the proposed measures (and related metrics) were defined so that their methodologies could be applicable at the same segment, corridor, facility, or other level, resulting in fine grain performance information suitable for

supporting the investment decisionmaking process at the statewide, metropolitan, and local levels. Finally, FHWA focused on using as much actual, observed data as is available to develop these measures. Together, these three measures provide a comprehensive picture of system performance, reliability and traffic congestion nationwide, both on the entire NHS and with a focus on areas that typically have the worst congestion.

#### Assessment of Proposed Measures for Subparts E and G (System Performance and Traffic Congestion)

The FHWA used a common methodology of 12 criteria to assess the appropriateness of each measure for national use and the readiness to implement the performance measure accurately and reliably.

- (A1) Is the measure focused on comprehensive performance outcomes?
- (A2) Has the measure been developed in partnership with key stakeholders?
- (A3) Can the measure accommodate changes in the future?
- (A4) Can the measure be used to support investment decisions, policy making, and target establishment?
- (A5) Can the measures be used to analyze performance trends?
- (A6) Is collection, storage, and reporting of measure data feasible?
- (B1) Timeliness
- (B2) Consistency
- (B3) Completeness
- (B4) Accuracy
- (B5) Accessibility
- (B6) Data Integration

Each performance measure, as used in current practice, was assessed against the 12 criteria using the following three ratings for each criterion.

- Green Rating—Criterion is fully met for the candidate measure
- Yellow Rating—Criterion is partially met for the candidate measure and work is underway to fully meet it the criterion
- Red Rating—Criterion is not fully met or no work is underway or planned that would allow the criterion to be met

The FHWA used the results of this assessment to identify gaps that FHWA could address through this rulemaking to improve the effectiveness of the measures in this NPRM. The rulemaking docket contains a description of the methodology used for this assessment. Table 5 below summarizes the results of the assessment for the proposed performance management measures for system performance and traffic congestion.

TABLE 5—SUMMARY OF PROPOSED PERFORMANCE MANAGEMENT MEASURES FOR SYSTEM PERFORMANCE AND TRAFFIC CONGESTION

Assessment factor	Percentage of system providing for reliable travel	Percentage of system where peak hour travel times meet expectations	Annual hours of excessive delay per capita
(A1) Is the measure focused on comprehensive performance outcomes? .....	G	G	Y
(A2) Has the measure been developed in partnership with key stakeholders? .....	Y	Y	Y
(A3) Is the measure maintainable to accommodate changes? .....	G	G	G
(A4) Can the measure be used to support investment decisions, policy making and target establishment? .....	G	G	G
(A5) Can the measures be used to analyze performance trends? .....	G	G	G
(A6) Has the feasibility and practicality to collect, store, and report data in support of the measures been considered? .....	G	G	G
(B1) Timeliness .....	G	G	G
(B2) Consistency .....	G	G	G
(B3) Completeness .....	Y	Y	Y
(B4) Accuracy .....	G	G	G
(B5) Accessibility .....	G	G	G
(B6) Data Integration .....	G	G	G

The factors that were assessed at a green level for the proposed measures were considered by FHWA in its choice of approach for system performance and traffic congestion measures. The FHWA also considered the factor assessed at yellow (B3—completeness) for all three measures as probe data is available on most of the NHS, but there are still some times of day and locations where data is not consistently available via the NPMRDS data set that FHWA is requiring for use for these measures. The FHWA believes that over time, as more probe data sources are added to the data set, that missing travel times will be minimized.

The FHWA proposal outlined in this NPRM attempts to address some of the gaps that exist today for the lower rated factors so that, when the new requirements are implemented, the measures result in an improved assessment rating, thereby better supporting national programs. In particular, FHWA factored the following considerations in its decision:

- Criterion A1—recognize that the Traffic Congestion measure (Annual Hours of Excessive Delay Per Capita) should ideally reflect the movement of all travelers and the performance of all modes. As proposed, the measure may not capture modal options or better accessibility. The FHWA is seeking comment on methods that can be used reliably to achieve this outcome.

- Criterion A2—recognize that a national measure is not in place for either system performance or traffic congestion and no national pilot studies have been conducted. However, FHWA and many State DOTs and MPOs have developed their own system performance/congestion measures and

these were considered in developing the national measures.

The specifics of these proposals are described in the Section-by-Section portion of this proposed rule.

#### *B. Selection of Proposed Measures for Subpart F—Freight Movement on the Interstate System*

This sub-section describes the FHWA's analysis of a range of data types and sources and measurement methods to support potential freight movement-related measures and describes FHWA's assessment of two proposed measures including: (1) Percent of Interstate System mileage meeting the goal for reliability; and (2) percent of Interstate System mileage considered uncongested (by speed). The FHWA assessed both these proposed measures in terms of appropriateness as national measures and readiness for implementation.

The FHWA selected reliability and average speed measures because they offered the best understanding of freight performance at the national level and had the widest support from stakeholders. The FHWA seeks to refine the use of freight-related measures in the future and broaden measures and data sources that can better inform future policy, programming, and investment decisions and provide a multimodal consideration of freight flow.

#### *Freight Movement Data Types and Sources Considered by FHWA*

The FHWA recognizes that the efficient movement of freight is important to the Nation's economy. Efficiency is hindered by slow speeds and unreliable travel times caused by

congested highways. For the freight industry, slow and unreliable travel results in diminished productivity by reducing the efficiency of operations, increasing costs of goods, increasing fuel costs, reducing drivers' available hours for service, and reducing equipment productivity. Reducing highway congestion could produce important benefits for the freight industry and contribute to our Nation's growing economy. Solutions must address the long-term and short-term freight needs and depend on participation from both the public and private sectors to fully understand performance and develop strategic solutions.

Historically, congestion data collection efforts focused exclusively on commuting in urbanized areas. To improve availability of freight data, FHWA launched the FPM program in 2002. This program collects truck travel-time data on major freight-significant corridors, intercity pairs along those corridors, and major U.S. international land-border crossings. Data are collected from embedded probe technology in approximately 600,000 trucks and are used to provide a range of performance measures including but not limited to travel times, speeds, congestion points, incident analysis, and diversions. Although FPM itself is not a system improvement, it is a mechanism for collecting and analyzing data to assist national, State, regional, and local transportation agencies in better measuring and managing highway transportation system performance. The availability of FPM data has the potential to inform future investment decisions that produce benefits of regional and national significance.



The FPM program complements other efforts by FHWA to monitor and measure urban congestion. Combining FPM data with urban congestion data such as HPMS data, economic data from the Freight Analysis Framework, and other relevant data provides a more complete picture of surface transportation system performance and identifies areas where performance could be improved. To provide a comprehensive understanding of freight performance in concert with passenger and total traffic congestion and performance, FHWA procured the NPMRDS in 2013, which provides travel times for all traffic, passenger, and freight with an archive of data beginning in October 2011. The FPM probe data is the freight data that is included in the NPMRDS travel time data. States and MPOs are currently using this data set to develop performance measures and support freight planning and other transportation plans. This data set allows a more comprehensive understanding of congestion for all types of traffic through the calculation of speed, reliability, and travel time on corridors with significant freight movement. As mentioned above, there is widespread support among stakeholders for these types of measures (e.g., speed, reliability, travel time). However, FHWA recognizes that a true picture of freight performance must reflect the multimodal nature of

freight. In addition to efforts to implement the performance requirements of 23 U.S.C. 150, FHWA expects to continue work currently underway with other modes and public and private freight stakeholders to develop new data opportunities and create additional measures to provide a multimodal and economic assessment of freight. These efforts would further an understanding of freight performance that will support other freight-related provisions within MAP-21 such as freight planning. This work, in addition to FHWA's current efforts for the FPM program, will provide a clearer picture of the total supply chain and goods movement system so that improvements can be even more precisely targeted.

#### Freight Movement Measures Considered by FHWA

The FHWA focused its evaluation of measures for 23 U.S.C. 150 for freight movement on Interstate on its significant research and leadership in FPM development through the FPM program, and stakeholder input. The FHWA recognizes that freight performance is best depicted by a series of measures to provide a comprehensive picture of freight movement. Stakeholders discussed multimodal measures and suites of measures to show performance in all aspects of freight movement. As the measures required for this rulemaking are only for

freight movement on the Interstate System, FHWA is addressing stakeholder requests for multimodal and multiarea measures through other MAP-21 freight requirements such as freight planning and the development of a Freight Conditions and Performance Report (see MAP-21, Section 1115). An additional factor in FHWA's assessment was the varying practices for FPM among stakeholders, including State DOTs and MPOs, resulting in a lack of national consistency on data and measurement. After considering the ongoing research in this area and stakeholder support for FHWA's FPM efforts, FHWA believes that its proposed use of a nationally consistent data set is the most consistent, efficient, and reliable means of understanding Interstate freight movement at the local, State, and national levels.

#### Assessment of Proposed Measures for Subpart F (Freight Movement)

The FHWA identified two proposed measures: (1) Percent of Interstate System mileage meeting the goal for reliability; and (2) percent of Interstate System mileage considered uncongested (by speed). The two measures proposed by FHWA were evaluated, based on existing state-of-practice, using the assessment process described in Section V.A of this section. Table 6 includes a summary of this assessment.

TABLE 6—SUMMARY OF PROPOSED PERFORMANCE MANAGEMENT MEASURES RELATING TO FREIGHT MOVEMENT

Assessment factor	Percent of interstate system mileage meeting goal for reliability	Percent of interstate system mileage uncongested (by speed)
(A1) Is the measure focused on comprehensive performance outcomes? .....	G	G
(A2) Has the measure been developed in partnership with key stakeholders? .....	G	G
(A3) Is the measure maintainable to accommodate changes? .....	G	G
(A4) Can the measure is used to support investment decisions, policy making and target establishment? .....	G	G
(A5) Can the measures be used to analyze performance trends? .....	G	G
(A6) Has the feasibility and practicality to collect, store, and report data in support of the measures been considered? .....	G	G
(B1) Timeliness .....	G	G
(B2) Consistency .....	G	G
(B3) Completeness .....	Y	Y
(B4) Accuracy .....	G	G
(B5) Accessibility .....	G	G
(B6) Data Integration .....	G	G

**Legend:** G = Green; Y = Yellow; R = Red.

The measures proposed by FHWA were considered against the criteria presented in Table 6. For all of the assessment factors except completeness, FHWA ranked these measures as “green.” The FHWA considered the measures against all of the criteria and weighed public and private stakeholder

input along with FHWA's experience in applying the measures. These measures were determined to be the two measures that most appropriately met all of the assessment factors and provide a comprehensive assessment of performance for freight so that public and private decisionmakers can identify

policy and operational improvements for goods movement. The FHWA considered the measures to be “yellow” for completeness only because they are proposed to rely on data from the NPMRDS, which has limited missing data that could impact the ability to conduct a complete assessment of

freight movement on the Interstate. While a robust data set, the NPMRDS does exhibit limitations, especially with missing travel time data when no probe passes a location in a 5-minute period (referred to as 5-minute bins). For the freight data, the NPMRDS uses a sample of approximately 600,000 trucks. The probes that are used to derive travel times in the NPMRDS generally provide national coverage. However, there are some areas of the Nation where there are fewer trucks or no truck activity reported. When this occurs, these bins would not be reported in the NPMRDS, and are missing from the dataset. The FHWA's internal assessment has demonstrated that, even with the missing data, the measures could still be calculated because the measures are based on annual averages. There are not enough missing 5 minute bins to make calculating the measure impossible. The FHWA recognizes the need to improve the completeness of the data and continues to work to improve this data set and include more trucks. It is expected that the truck sample will grow exponentially in coming years and over time the addition of more probe sources will reduce missing travel times.

#### C. Selection of Proposed Measures for Subpart H—On-Road Mobile Source Emissions

The following section includes an overview of the factors FHWA considered in the selection of a proposed measure for the assessment of on-road mobile source emissions as

required to administer the CMAQ program under 23 U.S.C. 149. (The previous section discusses proposed measures for Traffic Congestion to carry out the CMAQ program.) The FHWA wants the measure established through this rulemaking to:

- Meet CMAQ program performance requirements in 23 U.S.C. 149 and 150.
- Be mindful of existing emissions reduction reporting practices and data sets, thereby minimizing any additional burden on State DOTs and MPOs.
- Apply to CMAQ-funded projects instead of focusing on one project type (e.g., highways or transit).
- Apply to CMAQ-funded projects only in areas designated as nonattainment and maintenance for pollutants applicable to the CMAQ program (ozone (O<sub>3</sub>), carbon monoxide (CO), and particulate matter (PM)) versus all areas.

The FHWA received viewpoints on suggested measures as discussed above in Section III, Discussion of Stakeholder Engagement and Outreach. In addition, FHWA considered measures in use today to report on-road mobile source emissions reduction estimates. After consideration, FHWA identified four possible measures for preliminary consideration:

(1) *Emission Reductions by Pollutant*—A measure of the estimated emissions reduced by CMAQ-funded projects within a nonattainment or maintenance area. The emissions reductions would be calculated by pollutant and their applicable precursors.

(2) *Estimated Emission Reductions of CMAQ-Funded Projects Relative to Total Emission Reductions of the Nonattainment or Maintenance Area*—A measure that expresses the emissions reduced by CMAQ projects as a percentage of total emission reductions. Total emission reductions are calculated by taking the difference between the estimated emissions of all transportation projects and the total allowable emissions (i.e., emissions budget) within the nonattainment or maintenance area.

(3) *Estimated Emissions Reduction of CMAQ-Funded Projects Relative to Total Emissions of the Nonattainment or Maintenance Area*—A measure that expresses the emissions reduced by CMAQ-funded projects as a percentage of total emissions in the nonattainment or maintenance area. Total emissions would be obtained from the regional emissions estimates prepared for the conformity determination for the nonattainment or maintenance area.

(4) *Cost Effectiveness of CMAQ Projects*—A measure that compares the total amount of CMAQ funds spent in an area to estimated emissions reduced by those CMAQ projects.

#### Assessment of Potential Measures for Subpart H

The FHWA assessed the four potential on-road mobile source emission measures based on state-of-practice among States and MPOs and using the 12 criteria described in Section V.A. Table 7 below summarizes the results of this assessment.

TABLE 7—SUMMARY OF PROPOSED PERFORMANCE MANAGEMENT MEASURES FOR ON-ROAD MOBILE SOURCE EMISSIONS

Assessment factor	Emission reductions by pollutant	Estimated emission reductions of CMAQ-funded projects relative to total emission reductions of the area	Estimated emission reductions of CMAQ-funded projects relative to total emissions of area	Cost effectiveness of CMAQ projects
(A1) Is the measure focused on comprehensive performance outcomes? .....	G	G	G	G
(A2) Has the measure been developed in partnership with key stakeholders? .....	G	R	R	R
(A3) Is the measure maintainable to accommodate changes? .....	G	G	G	G
(A4) Can the measure be used to support investment decisions, policy making and target establishment? .....	G	Y	Y	G
(A5) Can the measures be used to analyze performance trends? .....	G	G	G	G
(A6) Has the feasibility and practicality to collect, store, and report data in support of the measures been considered? .....	G	Y	Y	Y
(B1) Timeliness .....	Y	Y	Y	Y
(B2) Consistency .....	Y	Y	Y	R
(B3) Completeness .....	Y	Y	Y	R
(B4) Accuracy .....	G	Y	Y	R
(B5) Accessibility .....	G	G	G	R
(B6) Data Integration .....	Y	R	R	R

Legend: G = Green; Y = Yellow; R = Red.

Based on the assessment summarized above and the additional principles described in this section, FHWA concluded that the last three measures were not suitable because they did not provide useful information for establishing targets, were not developed with key stakeholders, or in the case of cost effectiveness, data was not readily available. The measure that best fits the criteria established by FHWA was emissions reduction by pollutant. With respect to this measure, FHWA considered the following:

- Criterion B1—Measure recognizes that emissions are estimated, not measured, based on the expected benefit from building the project. Collecting emissions data on a project-by-project basis through vehicle probing or another means would be cost prohibitive and would take years to collect useable data.

- Criteria B2 and B3—Measure recognizes that no consistent method is being used across the country to estimate CMAQ project emission reductions and that although quantitative emissions analyses of air quality impacts is expected for almost all project types, qualitative assessments are acceptable when it is not possible to accurately quantify emissions reductions (*i.e.*, public education, marketing and other outreach efforts). The FHWA is conducting a number of research studies to develop tools to assist with consistency and completeness of emissions estimates, for those project types where it is possible to quantify emissions, but these tools will take time for FHWA to develop.

- Criterion B6—While the CMAQ Public Access System does include estimated emissions reductions by pollutant by project for each MPO and State that receives CMAQ funds, this database is not integrated with performance-related data such as a spatial component. Work is underway to improve and increase the functionalities of the database to support the performance planning activities.

The FHWA is proposing this approach to define the on-road mobile source emissions measure in a manner that is consistent with and reflects the various methods used today by State DOTs and MPOs to calculate on-road mobile source emissions and is consistent with the information received from stakeholders. The specifics of this proposal are described in the Section-by-Section portion of this proposed rule.

#### *D. Consideration of a Greenhouse Gas Emissions Measure*

The FHWA is seeking comment on whether and how to establish a CO<sub>2</sub> emissions measure in the final rule. The

FHWA received input through stakeholder listening sessions and various letters (available in the docket) suggesting that DOT add a GHG emissions measure because GHGs are correlated with fuel use and air toxins. One group of commenters specifically asked for a carbon emissions measure for mobile sources. However, it is clear that reducing CO<sub>2</sub> emissions is critical and timely. On-road sources account for over 80 percent of U.S. transportation sector GHGs. In an historic accord in Paris, the U.S. and over 190 other countries agreed to reduce GHG emissions, with the goal of limiting global temperature rise to less than 2 °C above pre-industrial levels by 2050.

According to the Intergovernmental Panel on Climate Change (IPCC), human activity is changing the earth's climate by causing the buildup of heat-trapping greenhouse gas emissions through the burning of fossil fuels and other human processes.<sup>43</sup> Transportation sources globally have been a rapidly increasing source of GHGs. Since 1970, GHGs produced by the transportation sector have more than doubled, increasing at a faster rate than any other end-use sector. The GHGs from total global on-road sources have more than tripled, accounting these sources account for more than 80 percent of the increase in total global transportation GHG emissions.<sup>44</sup> In the U.S., GHG emissions from on-road sources represent approximately 23 percent of economy-wide GHGs, but have accounted for more than two-thirds of the net increase in total U.S. GHGs since 1990,<sup>45</sup> during which time VMT also increased by more than 30 percent.<sup>46</sup>

A well-established scientific record has linked increasing GHG concentrations with a range of climatic effects, including increased global

temperatures that have the potential to result in dangerous and potentially irreversible changes in climate and weather. In December 2015, the Conference of Parties nations recognized the need for deep reductions in global emissions to hold the increase in global average temperature to well below 2 °C above pre-industrial levels, and are pursuing efforts to limit temperature increases to 1.5 °C. To that end, the accord calls on developed countries to take a leadership role in identifying economy-wide absolute emissions reduction targets and implementing mitigation programs. Also, as part of a 2014 bilateral agreement with China, the U.S. pledged to reduce GHG emissions to 26–28 percent below 2005 levels by 2025, with this emissions reduction pathway intended to support economy-wide reductions of 80 percent or more by 2050.

The FHWA recognizes that achieving U.S. climate goals will likely require significant GHG reductions from on-road transportation sources. To support the consideration of GHG emissions in transportation planning and decisionmaking, FHWA has developed a variety of resources to quantify on-road GHG emissions, evaluate GHG reduction strategies, and integrate climate analysis into the transportation planning process. The FHWA already encourages transportation agencies to consider GHG emissions as part of their performance-based decisionmaking, and has developed a handbook to assist State DOTs and MPOs interested in addressing GHG emissions through performance-based planning and programming.<sup>47</sup> The FHWA has developed tools to help State and local transportation agencies address GHG emissions associated with their systems. These include the Energy and Emissions Reduction Policy Analysis Tool (EERPAT),<sup>48</sup> a model that evaluates the impacts of CO<sub>2</sub> reduction policies for surface transportation, and the Infrastructure Carbon Estimator (ICE),<sup>49</sup> a tool that specifically evaluates CO<sub>2</sub> associated with the construction and maintenance of transportation infrastructure. The FHWA is also currently conducting a number of pilots

<sup>43</sup> The IPCC Document: IPCC, 2014: Summary for Policymakers. In: Climate Change 2014: Mitigation of Climate Change. Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change. <http://mitigation2014.org/report/summary-for-policy-makers>.

<sup>44</sup> Sims, et al. 2014: Transport. In Climate Change 2014, Mitigation of Climate Change. [http://ipcc.ch/pdf/assessment-report/ar5/wg3/ipcc\\_wg3\\_ar5\\_full.pdf](http://ipcc.ch/pdf/assessment-report/ar5/wg3/ipcc_wg3_ar5_full.pdf). Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change. p. 605. [http://ipcc.ch/pdf/assessment-report/ar5/wg3/ipcc\\_wg3\\_ar5\\_chapter8.pdf](http://ipcc.ch/pdf/assessment-report/ar5/wg3/ipcc_wg3_ar5_chapter8.pdf).

<sup>45</sup> This is the first year of official U.S. data.

<sup>46</sup> U.S. Environmental Protection Agency, 2015. Inventory of U.S. Greenhouse Gas Emissions and Sinks, 1990–2015. Washington, DC. Tables 2–1 and 2–13. Federal Highway Administration, 2013 Status of the Nation's Highways, Bridges, and Transit: Conditions & Performance. Washington, DC. Exhibit 1–3. <https://www3.epa.gov/climatechange/Downloads/ghgemissions/US-GHG-Inventory-2016-Main-Text.pdf>.

<sup>47</sup> A Performance-Based Approach to Addressing Greenhouse Gas Emissions through Transportation Planning, available at [http://www.fhwa.dot.gov/environment/climate\\_change/mitigation/publications\\_and\\_tools/ghg\\_planning/ghg\\_planning.pdf](http://www.fhwa.dot.gov/environment/climate_change/mitigation/publications_and_tools/ghg_planning/ghg_planning.pdf).

<sup>48</sup> The Energy and Emissions Reduction Policy Analysis Tool (EERPAT), available at [https://www.planning.dot.gov/FHWA\\_tool/](https://www.planning.dot.gov/FHWA_tool/).

<sup>49</sup> The Infrastructure Carbon Estimator (ICE), available at [http://www.fhwa.dot.gov/environment/climate\\_change/mitigation/publications\\_and\\_tools/carbon\\_estimator/](http://www.fhwa.dot.gov/environment/climate_change/mitigation/publications_and_tools/carbon_estimator/).



to analyze the potential GHG emission reductions associated with various transportation-related mitigation strategies.<sup>50</sup> Even with these efforts, FHWA recognizes that more will be needed to meet the U.S. climate goals.

The FHWA is considering how GHG emissions could be estimated and used to inform planning and programming decisions to reduce long term emissions. If FHWA were to establish a measure, we believe that, in the context of this rulemaking, GHG emissions would be best measured as the total annual tons of CO<sub>2</sub> from all on-road mobile sources. The FHWA is seeking comment on the potential establishment and effectiveness of a measure as a planning, programming, and reporting tool, and how we could address the following considerations in the design of a measure:

- Should the measure address all on-road mobile sources or should it focus only on a particular vehicle type (e.g., light-duty vehicles)?
- Should the measure be normalized by changes in population, economic activity, or other factors (e.g., per capita or per unit of gross state product)?
- Should the measure be limited to emissions coming from the tailpipe, or should it consider emissions generated upstream in the life cycle of the vehicle operations (e.g., emissions from the extraction/refining of petroleum products and the emissions from power plants to provide power for electric vehicles)?
- Should the measure include non-road sources, such as construction and maintenance activities associated with Title 23 projects?
- Should CO<sub>2</sub> emissions performance be estimated based on gasoline and diesel fuel sales, system use (vehicle miles traveled), or other surrogates?
- Due to the nature of CO<sub>2</sub> emissions (e.g., geographic scope and cumulative effects) and their relationship to climate change effects across all parts of the country, should the measure apply to all States and MPOs? Is there any criteria that would limit the applicability to only a portion of the States or MPOs?
- Would a performance measure on CO<sub>2</sub> emissions help to improve transparency and to realign incentives such that State DOTs and MPOs are better positioned to meet national climate change goals?
- The target establishment framework proposed in this rulemaking requires that States and MPOs would establish 2

and 4 year targets that lead to longer term performance expectations documented in longer range plans. Is this framework appropriate for a CO<sub>2</sub> emissions measure? If not, what would be a more appropriate framework?

- Should short term targets be a reflection of improvements from a baseline (e.g., percent reduction in CO<sub>2</sub> emissions) or an absolute value?
- What data sources and tools are readily available or are needed to track and report CO<sub>2</sub> emissions from on-road sources?
- What tools are needed to help transportation agencies project future emissions and establish targets for a CO<sub>2</sub> emission measure?
- How long would it take for transportation agencies to implement such a measure?
- Additionally, the FHWA requests data about the potential agency implementation costs and public benefits associated with establishing a CO<sub>2</sub> emissions measure.

## VI. Section-by-Section Discussion of the General Information and Proposed Performance Measures Sections

This section discusses how the proposed regulations address MAP-21's charge to establish performance measures for State DOTs and MPOs to use to assess: The performance of the Interstate System and non-Interstate NHS for the purpose of carrying out the NHPP; freight movement on the Interstate System; and traffic congestion and on-road mobile source emissions for the purpose of carrying out the CMAQ program. Subpart A discusses common aspects of the proposed rulemaking related to definitions, reporting, significant progress determination, and target establishment. Discussion of the performance measures is organized into four subparts covering three performance areas, including: Subpart E, which discusses proposed measures to assess performance of the NHS; Subpart F, which discusses the proposed measure to assess freight movement on the Interstate System; and Subparts G and H, which discuss the proposed CMAQ measures to assess traffic congestion and on-road mobile source emissions, respectively.

Subparts E, F, G, and H of the proposed regulations provide the requirements for the system performance, traffic congestion, freight movement, and on-road mobile source emissions measures, including any required methodologies for data collection, data requirements, and processes for calculating the measures. The Section-by-Section discussion also addresses procedural discrepancies in

data collection and reporting, and attempts to align them using the latest research and state-of-the-practice experience to provide consistent national performance measures.

### A. Common Issues Across Subparts E, F, and G

The FHWA established and followed certain standards in the development of the requirements proposed in Subparts E, F, and G. For example, for the proposed rules associated with assessing the performance of the NHS, freight movement on the Interstate, and traffic congestion, FHWA attempted to use a consistent framework and structure, to the extent possible, because the performance measures associated with these subparts are largely based on vehicle travel times and speeds. The following sub-sections summarize the overarching framework and guiding principles used across these subparts. Information related to the development of the requirements proposed in Subpart H is discussed separately.

#### Measures That Focus on Outcomes for Assessing the Performance of the NHS, Freight Movement on the Interstate, and Traffic Congestion

Transportation performance outcomes can be impacted through the use of a wide range of strategies that support the transportation priorities and policies of local areas. In its decisionmaking to develop proposed measures, FHWA was careful to avoid any measures that would impact the ability of a State DOT or MPO to make decisions that work for the local area. For this reason, FHWA focused only on measures that track transportation performance where outcomes could tell a national story.

The proposed measures in Subparts E, F, and G of this rulemaking focus primarily on the consistency and efficiency of travel times on our Nation's highways. Improvements to this outcome could be the result of a wide range of strategies such as those that would improve the operations of highway facilities and those that would decrease the demand on highway facilities by providing alternative transportation choices. The FHWA believes that the selection of these strategies is a local decision and should not be influenced directly by the measure itself. For this reason, FHWA elected not to propose measures that would directly measure the implementation of strategies to improve system operations (i.e., percent modal use, or number of managed lanes).

<sup>50</sup> FHWA's Greenhouse Gas/Energy Analysis Demonstration projects are described at [http://www.fhwa.dot.gov/environment/climate\\_change/mitigation/ongoing\\_and\\_current\\_research/](http://www.fhwa.dot.gov/environment/climate_change/mitigation/ongoing_and_current_research/).

Measures That Use Travel Time Data for Assessing the Performance of the NHS, Freight Movement on the Interstate, and Traffic Congestion

This rulemaking's proposals for subparts E, F, and G (performance of the NHS, freight movement on the Interstate, and traffic congestion-related measures) are based on travel times or travel speeds of highway users. Travel times and speeds are being proposed as the basis for these measures as FHWA feels that this information accurately reflects highway operational performance and that the data can be captured across the full NHS in an accessible national data source in a timely and reliable manner. The FHWA is proposing the use of the new NPMRDS as the data source to calculate the metrics for the seven travel time/speed based measures to ensure consistency and coverage at a national level. This data set provides travel times representative of all traffic (freight and passenger vehicles) traveling on the NHS and captures this information every 5 minutes throughout every day of the year. The FHWA expects to continue to provide this data set to State DOTs and MPOs as long as there is a need at a national level for this information. The proposed regulations allow State DOTs to use alternative data sources provided the data set is considered at least equivalent in quality, coverage, and timeliness to the NPMRDS and is approved by FHWA. States DOTs and MPOs have the option to relate the travel time data provided in the NPMRDS to their relevant location referencing system (typically used for transportation planning).

As proposed in section 490.103, States and MPOs shall cooperatively develop and share information related to transportation systems performance data. The transportation systems performance data would include the travel time data set, the selected reporting segments, and the desired peak period travel time required for use under subparts E, F, and G.

When the State DOT selects the travel time data set, it must coordinate with the MPOs in the State that are subject to creating the metrics and measures in subparts E, F, and G. When the State selects the reporting segments and the Desired Peak Period Travel Time for a particular reporting segment, State DOTs must coordinate with the applicable MPOs that contain the reporting segment within their metropolitan planning area boundary. States and MPOs must use the same data (the travel time data set, the reporting segments, and the desired

peak period travel time for a reporting segment) for the purposes of calculating the metrics and measures.

Dealing With Missing Data When Assessing the Performance of the NHS, Freight Movement on the Interstate, and Traffic Congestion

Travel times and speeds of highway users may be captured from a variety of sources such as mobile phones, vehicle transponders, portable navigation devices, roadway sensors, and cameras. It is possible that during the day, during specific 5-minute intervals, travel time or speed data cannot be captured. Five-minute bins without data would not be reported in the NPMRDS, and would therefore be considered missing. This can occur due to one of the following reasons:

- Reason 1—No users traveled on the roadway during the 5-minute interval, or
- Reason 2—Travel occurred on the roadway but no sources of data were recognized (*i.e.*, mobile phones, vehicle transponders, portable navigation devices), or
- Reason 3—Equipment failure (*e.g.*, sensor malfunction, communication system failure).

The FHWA believes that, although missing data is possible due to Reason 2 listed above, the likelihood of this condition occurring will decrease over time as data capture technologies advance and as a greater percentage of highway users carry equipment that allows them to become viable travel time data sources. The FHWA also believes that it is valid to assume that travel occurring under the conditions that would result in missing data for Reason 1 would be consistent with free flow travel speeds. Lastly, for Reason 3, FHWA realizes that there are times when equipment used to capture data may fail because of usage, damage, or other causes. The FHWA believes this will be a more infrequent cause of missing information than Reason 1. For these reasons, FHWA is proposing in this rulemaking that missing travel time data be assumed to be occurring due to Reason 1 for purposes of the reliability measures (both freight and system performance) on the Interstate and, consequently, assumes travel times that are consistent with posted speed limits when data is missing.

The FHWA found, after analysis of missing data in the NPMRDS (a white-paper on missing data/outliers' impact on proposed measures is included in the docket), that there was currently sufficient data for the Interstate so States and MPOs could establish reasonable targets. However, the analysis also

demonstrated that at the current time there is enough missing data for the non-Interstate NHS that it could impact the ability of States and MPOs to establish targets. Accordingly, FHWA is proposing that the non-Interstate reliability measures would be phased in, giving the States and MPOs an opportunity to understand the impact of missing data on target establishment and time for the NPMRDS to become more complete.

Regarding the peak hour travel time measures, which include both the Interstate and non-Interstate NHS, the measures rely on hourly average travel times. Missing data does not have the same impact on target establishment for the peak hour travel time measures as it does for the reliability measures. So, FHWA proposes no replacement of missing data for either of the peak hour measures. However, in its analysis of the data, FHWA noted that outliers could have an effect on these measures, so FHWA is proposing that States and MPOs remove extreme outliers (*i.e.*, those travel times at speeds less than 2 mph and over 100 mph) from the data set before calculating the peak hour measures. These outliers are further discussed in a white-paper on missing data/outliers' impact on proposed measures, which is included in the docket.

Missing data potentially could have an impact on target establishment for the traffic congestion measure (Annual Hours of Excessive Delay Per Capita). Because this is a delay measure that sums all the delay identified on segments, missing data could mean missing some delay in calculating the measure. This could make it difficult for States and MPOs to achieve targets due to more complete data may be available in the future. The FHWA is proposing that this measure would be phased in, to allow States and MPOs time to understand the impact of missing data on establishing targets, and for the NPMRDS to become more complete.

As mentioned, a white-paper on missing data/outliers' impact on proposed measures is included in the docket. This paper includes information on options such as applying a path-type processing that uses the actual observations of the vehicles on segments adjacent to those segments with missing data and that traversed the segment with missing data to fill in the missing travel times, and the impacts of trimming the data at 2 and 100 mph. The FHWA is seeking comment on this process and other processes that FHWA should consider to improve missing data and outlier impacts.



#### Phasing in Target Establishment Requirements for Less Mature Measures

The FHWA is proposing a phased-in approach to the establishment of targets for both the non-Interstate NHS reliability measure and the traffic congestion (excessive delay) measure. The phased-in approach would provide 2 years for data coverage on non-Interstate NHS roadways to be more complete and for States and MPOs to understand the impacts of missing data on establishing targets. The completeness of travel time data in the NPMRDS is greater for the Interstate as compared to other NHS roadways. The FHWA believes that the completeness of data in the NPMRDS will improve over time as sources become more prevalent (missing data is discussed in a white paper provided on the docket). The FHWA also believes that State DOTs have more experience in collecting and reporting reliability and congestion performance on the Interstate as compared to other NHS roadways and, as a result, are more readily capable to establish targets for the Interstate System. However, missing data for the non-Interstate NHS may lead to uncertainty for State DOTs and MPOs as they establish targets. Giving time to State DOTs and MPOs to establish targets for the non-Interstate NHS may help them learn how to manage that uncertainty. For these reasons, FHWA believes that a phased approach to target establishment is appropriate for those measures that are derived from data on the non-Interstate NHS.

#### Travel Time Reliability for Assessing the Performance of the NHS and Freight Movement on the Interstate

The FHWA heard consistently from stakeholders that managing the travel time reliability of the highway network is important and should be considered as part of this rulemaking. For this reason, as part of this rulemaking FHWA is proposing the establishment of travel time reliability measures. In general, the proposed reliability measures address: (1) The reliability of the entire NHS for all travelers; and (2) the reliability of the Interstate System for longer haul freight movements. Reliability focuses on variability in travel times, and the travel time measures in this rulemaking focus on identifying portions of the NHS and Interstate (for freight) that have high levels of unreliable travel. An example of unreliable travel is a trip that takes 30 minutes on a typical day but could take over 45 minutes on a random day. This extra trip time might be due to a road or lane closure, a traffic accident, or bad

weather. The FHWA intends that the measure for reliability of the NHS for all travelers would be used to identify the areas of the transportation network where there are the greatest impacts on travel when non-recurring incidents occur. Non-recurring incidents include temporary disruptions, such as incidents ranging from a flat tire to an overturned hazardous material truck, work zones, weather, and special events. In contrast, the proposed measure for freight travel time reliability is based only on freight travel and considers the longest travel times experienced as compared to travel times more likely during normal travel time conditions throughout all hours of the day. The index provided by this reliability measure is an important piece of information for shippers and suppliers so they can plan for a higher likelihood of on-time arrivals of deliveries. These reliability measures are discussed in more detail in the section-by-section portion of this NPRM.

#### Travel Time Delay for Assessing Freight Movement on the Interstate and Traffic Congestion

The FHWA is proposing two measures to assess traffic congestion: (1) One measure to represent congestion impacting freight movement, which is proposed in Subpart F; and (2) One measure to represent overall traffic congestion, which is proposed in Subpart G. Although both proposed measures use delay as the basis for determining congestion, the two differ in design and intended purpose.

The first proposed congestion measure related to freight movement is focused on delay and is intended to be used to assess delay that could occur on the Interstate System. This proposed delay measure represents the percentage of the Interstate System that is uncongested as defined by a speed threshold of 50 mph. The FHWA aimed to understand the point of inflection to consider speeds and viewed 50 mph as appropriate for this measure. This is due in part because trucks often have speed governors installed on them so that they cannot travel much faster than 55 mph. Additionally, freight stakeholders commented that 50 mph or greater is where they would like to be in terms of average speed. The FHWA is seeking comment on this threshold.

The second proposed measure, related to traffic congestion and focused on Annual Hours of Excessive Delay Per Capita, is intended to be used to assess delays that FHWA believes would be considered excessive by users of the NHS roadways in large urbanized areas.

This proposed delay measure is an indication of the additional time spent by all users of the system (quantified by the total estimated vehicles using the system) when traveling at speeds considerably lower than typical speed limits. In addition, this measure is proposed to be only applicable to the largest urbanized areas in the country: The portion of those that exceed a population of 1 million.

#### Reliable Performance for the NHS and Freight Movement on the Interstate

Three of the eight measures proposed in this rulemaking focus on measuring reliable performance: (1) Section 490.507(a)(1) Percent of the Interstate System providing for reliable travel times, (2) Section 490.507(a)(2) Percent of the non-Interstate NHS providing for reliable travel times, and (3) Section 490.607(a) Percent of the Interstate System Mileage providing reliable truck travel times. The discussions provided in this section provide an explanation of how “reliable” performance is defined, understanding that the meaning of this term can be very subjective, especially when discussing outcomes that are derived from travel time and speed data. Each of the measures that focus on “reliable” performance includes a clearly defined calculation to remove any subjectivity in the meaning of the term. As discussed above, FHWA is proposing measures that, although they include similar methods of calculation, would be used to assess different aspects of highway performance. In general, reliable performance for the five proposed measures can be grouped as follows:

- Subpart E—Travel time reliability as being *reliable for highway users*;
- Subpart F—Truck travel time reliability as being *reliable for shippers and suppliers*.

Additional discussion is provided in each subpart to explain the method used to identify the percentage of the transportation network that would be considered “reliable” to these different users and stakeholders.

#### Impact of Traffic Volumes on Travel Time Derived Measures

The measures being proposed in this rulemaking that are derived from travel times reflect: System reliability, peak hour travel times, truck congestion, and excessive delay. With the exception of excessive delay, FHWA did not factor the volume of traffic in the calculations for these proposed measures. Consequently, these measures do not directly capture the weight of traffic volumes in the results. Rather, the measures are calculated based on the



length of roadway segments. Table 8 below provides a very simple example to illustrate the impact of traffic volume on the measure calculation:

TABLE 8—AN EXAMPLE TO ILLUSTRATE THE IMPACT OF TRAFFIC VOLUME ON THE MEASURE CALCULATION

Road segment length (direction-miles)	Annual traffic volume (thousands of vehicles)	Reliable?	Length reliable (direction-miles)	Vehicle miles reliable (thousands)	Vehicle miles traveled (thousands)
5 .....	2,700	Yes .....	5	13,500	13,500
1 .....	73,000	No .....	0	0	73,000
3 .....	5,000	Yes .....	3	15,000	15,000
6 .....	1,700	No .....	0	0	10,200
2 .....	50,000	Yes .....	2	100,000	0
2 .....	18,000	Yes .....	2	36,000	36,000
1 .....	75,000	Yes .....	1	75,000	75,000
Total = 20 .....			Total = 13	Total = 239,500	Total = 322,700

In this simplified example using a mileage based approach 13 direction-miles, or 65.0 percent (13/20), of the network would be considered “reliable,” and using a volume weighted approach 239,500 VMT, or 74.2 percent (239,500/322,700), of the VMT would have been “reliable.” This example illustrates the differences in these two approaches.

Except for the excessive delay measure, FHWA elected to use a mileage based approach and not to weigh the measures by volume due to the absence of data regarding actual traffic volumes particularly for the level of roadway coverage and granularity needed (entire NHS and 5-minute temporal granularity). The system reliability, peak hour travel times, and truck congestion measures are intended to evaluate system performance. This objective can be achieved by analyzing performance on roadway segments and then indicating, via roadway segment length, whether or not a segment is performing to a satisfactory level (based on thresholds defined in this rule). If actual, observed volumes were available at these roadway segment levels every 5 minutes as well, an optional approach would be to identify the amount of VMT that met the measure thresholds, as demonstrated in Table 8. This would require actual volume counts every 5 minutes for every NHS road segment, data which do not currently exist. The FHWA believes it would be inappropriate to introduce estimated data for these measures, which are otherwise focused on actual data. As a result, FHWA is proposing the use of roadway segment length as the means for reporting the metrics and measures.

In addition, FHWA believes performance expressed as the percent of the system mileage is more easily understood by the public as compared to measures that would be expressed as

the percentage of vehicle miles traveled. The FHWA encourages State DOTs and MPOs to consider strategies that would provide the greatest impact to improving the performance of overall traffic volumes by focusing on roadway segments that carry higher volumes of traffic.

The Total Excessive Delay measure, on the other hand, needs to be weighted by something to be meaningful, as it is basically a sum of all the excessive travel times on the NHS in an urban area. If excessive delay during a 5 minute period (say 5 seconds) were simply totaled for every 5 minute period and roadway segment, then the excessive delay travel time on a roadway segment with one car would be equivalent to a roadway segment with 110 cars. Such an analysis would not capture the scope of the delay (how many vehicles are actually experiencing that 5 second excessive travel time). Hourly volumes (of vehicles) are a typical means of weighting delay measures. Therefore, for the Total Excessive Delay measure, FHWA requires development of hourly volumes based on actual vehicle counts or estimated from AADT (an estimated number from limited vehicle count data). State DOTs and MPOs can develop hourly volume estimates with AADT information provided to HPMS every year for their NHS roadways. In this case, using the best-available data, even if it is estimated, is preferable than not using such data, because DOTs and MPOs would have difficulty setting targets for this measure without weighting it by the number of vehicles experiencing the delay.

The FHWA is seeking comments on this approach and encourages comments suggesting alternative methods that may more effectively capture the impact of performance changes on differing levels of system use.

Focus on Large Urbanized Areas for Assessing the Performance of the NHS and Traffic Congestion

In addition to travel time reliability, FHWA is proposing travel time or speed based measures to assess and manage the worst areas of delay or congestion in large urbanized areas. The FHWA felt that this type of measure was most applicable to urbanized areas where populations are greater than 1 million, as these areas are where delay is most likely to occur, and where State DOTs and MPOs likely have a greater level of capability, experience, and need to manage the traffic operations. As proposed, three of the seven travel time or speed based measures are limited to these large urbanized areas. They are: (1) Section 490.507(b)(1) Percent of the Interstate System where peak hour travel times meet expectations, (2) section 490.507(b)(2) Percent of the non-Interstate NHS where peak hour travel times meet expectations, and (3) section 490.707 Annual Hours of Excessive Delay Per Capita. The peak hour travel time measures capture congestion only during peak periods of use (commute-related congestion) and the annual hours of excessive delay per capita captures congestion throughout the day (overall delay).

The FHWA is proposing that only urbanized areas over 1 million in population would be subject to these measures because of the additional performance-reporting requirements that these areas, which are also nonattainment or maintenance areas, have to complete for the CMAQ-related measures (23 U.S.C. 149(l)) including Annual Hours of Excessive Delay per Capita. By requiring MPOs in these areas to do additional CMAQ performance reporting, Congress placed a special emphasis on these larger urbanized areas. The FHWA considered this emphasis when it evaluated

whether all areas or only a smaller subset of areas within a State should be subject to the traffic congestion measure.

In FHWA's experience, areas over 1 million in population are generally more complex from a transportation perspective. Those areas have more population, resulting in more trips. These areas also tend to have a variety of transportation options available, including highways, airports, commercial rail. In more concentrated urban environments, the areas may also be more constrained in terms of where any new facilities to accommodate demand can be located. There also may be higher costs for right-of-way acquisition. For all these reasons, FHWA's experience is that transportation planning in these larger urban areas is generally more complex than in areas less than 1 million in population, resulting in a greater need to manage the transportation system and, specifically, traffic operations. In addition, these larger areas do receive more Surface Transportation Program suballocated funding than smaller areas (see 23 U.S.C. 133(d)). For all these reasons, FHWA believe it is important that these areas look more closely peak hour travel times and excessive delay as they are managing traffic operations.

The FHWA also considered whether the measure should apply: To another subset of areas within the State, such as areas where MPOs serve a TMA<sup>51</sup> as these areas may have more experience with the congestion management process provided for in 23 U.S.C. 134(k); to all urbanized areas within the State; or to the entire State. Because of the additional burden involved in measuring peak hour and traffic congestion, FHWA is proposing that only urbanized areas where populations are greater than 1 million in population would be subject to these measures. The FHWA is requesting comment on: Whether a population threshold should be used for determining the measure applicability; and if so then whether 1 million is the appropriate threshold, or whether another threshold (e.g., population over 200,000) would be more appropriate.

Within the United States there are 42 urbanized areas that have populations greater than 1 million based on the most recent U.S. Census (2010). These 42 areas are included within or intersect with 35 State and 67 metropolitan

planning area boundaries. The FHWA is proposing that for these measures (traffic congestion measure and the peak hour travel time measures for system performance), one single target be established for the roadways within the urbanized area, including those areas that intersect with multiple State and metropolitan planning area boundaries. This single target would need to be agreed upon and shared by all of the entities in the urbanized area. For example, one target would be established for the Philadelphia urbanized area that would be shared by the four States and four MPOs that collectively make transportation investment decisions for the area. The FHWA recognizes that for these large areas, performance is not constrained by political boundaries and that strategies to address performance should be addressed regionally and across political boundaries. For these measures, strategies taken in one political jurisdiction can have direct and indirect impacts when measuring performance in another proximate political jurisdiction. The FHWA felt that this approach would increase the potential for coordination across jurisdictions to manage the overall performance of the region.

#### Starting With Highways and Expanding to Other Surface Transportation Modes for Assessing Traffic Congestion

The FHWA heard from many stakeholders that the traffic congestion measure should consider the mobility of travelers using all modes of surface transportation such as highways, commuter railways, bikeways, and walkways. The measure proposed in this rulemaking to assess traffic congestion does not fully address this as it is focused only on vehicle delays on NHS highways. The FHWA elected to propose a vehicle delay measure at this time due to the limited availability of reliable, accurate, comprehensive, and timely data for the other surface transportation modes. This type of data would be needed to calculate a more comprehensive delay measure that considers all travelers and all surface modes of transportation. However, FHWA would like to move to a measure in the future that would consider the mobility of travelers using all surface modes of transportation and is seeking comment on feasible approaches that can be taken to move toward the development of such a measure. The CMAQ traffic congestion delay measure proposed in this rulemaking does consider the travel times of vehicles and passengers to the extent they are captured as sources during data

collection. In addition, the CMAQ traffic congestion delay measure is expressed as a rate by dividing the total vehicle delay in the area by the total population of the area, which would potentially reflect successful implementation of strategies to provide transportation choices other than highway travel. This proposal is discussed in more detail in the Section-by-Section portion of this preamble for Subpart G.

#### Improving the Operations of the Existing Transportation Network by Assessing Traffic Congestion

The FHWA heard from many stakeholders that the traffic congestion measure should directly capture the impact of transportation network connectivity issues and land use decisionmaking to improve public accessibility to essential services. The FHWA believes that the delay measure proposed in this rulemaking to assess traffic congestion will reflect these types of strategies to the degree they minimize impacts on highway traffic operations. However, FHWA is not proposing a measure to directly assess transportation connectivity or accessibility. The focus of the proposed measure is to improve the operations of the existing network by reducing congestion, and does not assess if the network or use of land, as designed, is providing for the most efficient connections to adequately move people and goods from their origin to their destination. The FHWA believes that the scope of 23 U.S.C. 150(c) relates to establishing measures for State DOTs and MPOs to use to assess traffic congestion for the purpose of carrying out section 149, which is a component of the Federal-aid highway program. Improving overall network connectivity is a priority for DOT and FHWA. Outside of this rulemaking, FHWA, in cooperation with FTA, is actively working with transportation operating agencies and planning organizations on efforts to understand and advance best practices in assessing and managing transportation network connectivity to improve public accessibility to essential services.

#### B. Issues Relating to Subpart H

In the development of the requirements in Subpart H, FHWA attempted to use a similar approach as in other subparts. Subpart H is focused on emissions reduced by CMAQ-funded projects in a nonattainment or maintenance area. A summary of the framework used is discussed below.

<sup>51</sup> A transportation management area (TMA) is defined in Federal statute (23 U.S.C. 134(k)) as an urbanized area having a population of over 200,000, or otherwise designated by the Governor and the MPO and officially designated by the FHWA and FTA Administrators.

## Use of Existing/Available Dataset for Assessing On-Road Mobile Source Emissions

This rulemaking proposes to use data included in the existing CMAQ Public Access System to calculate the metric for the on-road mobile source emissions measure. The CMAQ Public Access System is a database of CMAQ project information reported by each State DOT as part of the CMAQ annual reports to FHWA. The Public Access System contains all CMAQ-funded projects by Federal fiscal year and their estimated emissions reductions by pollutant and precursor applicable to the CMAQ program. For purposes of calculating the on-road mobile source emissions measure, use of this existing data set provides a national data source for emissions reductions estimates and will not require a new data collection process.

## Dealing With Missing Data When Assessing On-Road Mobile Source Emissions

While quantitative emissions reductions are expected for most projects entered into the CMAQ Public Access System, it is not required nor has it been possible for some pollutants, especially PM emissions. Project sponsors have always had the option to provide a qualitative assessment based on a reasoned and logical evaluation of a project or programs emission benefits. Also, prior to December 20, 2012, EPA's emission model had significant limitations that made it unsatisfactory for use in microscale analyses of PM<sub>2.5</sub> and PM<sub>10</sub> emissions. Once MOVES was released on December 20, 2010, areas had a 2 year grace period before the model was required to be used for CAA purposes and many areas also used that grace period to transition to using the model for estimating emissions for CMAQ projects. Therefore, the CMAQ Public Access System includes a mix of both quantitative and qualitative emissions estimates, and in some cases, incomplete emissions estimates for certain pollutants.<sup>52</sup>

In order to reflect the performance of the CMAQ program in reducing on-road mobile source emissions, FHWA is proposing to include only projects with quantitative emissions estimates in the proposed measure. The FHWA understands that State DOTs and/or MPOs may want to amend their project information with quantitative emissions estimates so the emissions reductions can be included in the performance

measure. The FHWA is proposing that State DOTs and/or MPOs be allowed to amend their emissions information for projects in the CMAQ Public Access System to include a quantitative emissions estimate where a qualitative analysis may have been used in the past or, in the case of PM emissions, where an appropriate model was not available. State DOTs and/or MPOs would not be required to amend their project information, but we are also soliciting comments on other ways State DOTs and/or MPOs may update or amend their project information with quantitative emissions estimates for use in implementing this performance measure.

## Focus on Nonattainment and Maintenance Areas When Assessing On-Road Mobile Source Emissions

The FHWA heard from stakeholders that while all States receive some level of CMAQ funding, the CMAQ on-road mobile source emissions measure should only apply in nonattainment and maintenance areas. The main purpose of the CMAQ program is to fund transportation projects or programs that will contribute to attainment or maintenance of the NAAQS for O<sub>3</sub>, CO, and PM (both PM<sub>10</sub> and PM<sub>2.5</sub>). Therefore, FHWA determined that the performance measure should also focus on that same purpose. For this reason, the proposed measure in this rulemaking is only applicable to nonattainment and maintenance areas within a State. If a State does not have any nonattainment or maintenance areas, then FHWA is proposing this measure would not apply to them.

## Further Improvements to the Public Access System To Ease the Assessment On-Road Mobile Source Emissions

While the CMAQ Public Access System has been available since summer 2011, and FHWA has been keeping a database of CMAQ projects and their estimated emissions since the beginning of the program, there are opportunities to improve the data. In addition to increasing the number of projects with quantitative emissions estimates, the quality of the data and methods used to calculate emissions can also be improved. The FHWA is developing a tool kit, that will be released in modules beginning late spring 2016, of best practices for estimating emissions by project type for project sponsors to improve the assumptions and calculations used in their quantitative estimates. The FHWA developed cost

effectiveness tables<sup>53</sup> to be used as a guide by State DOTs and MPOs during the project selection process and when developing performance plans under 23 U.S.C. 149(l). Finally, FHWA also improved the function and usability of the Public Access System in February 2016 to make it easier to develop reports needed for both this rulemaking and the CMAQ performance plan requirements under 23 U.S.C. 149(l).<sup>54</sup>

## C. Detailed Discussion of the Proposed Subparts

The elements discussed above were used by FHWA to develop the proposed regulations presented in this rulemaking. The next sections of this NPRM provide detailed discussions on each of the proposed measures and how they could be used by State DOTs and MPOs to establish and report on targets and by FHWA to assess progress made toward the achievement of targets.

### 1. Subpart A: General Information, Target Establishment, Reporting, and NHPP and NHFP Significant Progress Determination

In this section, FHWA describes the proposed additions to Subpart A, which covers general information, target establishment, reporting, and NHPP and NHFP significant progress determination. This section builds on the proposal introduced in the second NPRM that covered measures to assess pavement and bridge condition on the NHS. For a complete picture, readers are directed to the docket which contains the regulatory text for Subpart A in its entirety. In addition, this section also incorporates the FAST Act changes to the NHPP significant progress determination, and the addition of a requirement for a NHFP significant progress determination. The discussions of the proposed requirements are organized as follows:

- Section 490.101 discusses proposed definitions;
- Section 490.103 describes the proposed data requirements;
- Section 490.105 presents the proposed requirements related to establishing performance targets;
- Section 490.107 discusses reporting on performance targets;
- Section 490.109 describes assessing significant progress toward achieving the performance targets for the NHPP and NHFP; and,
- Section 490.111 discusses the material FHWA would incorporate by reference into the proposed rule.

<sup>52</sup> FHWA is currently conducting a research effort in an attempt to understand the impact of missing data in the implementation of this measure.

<sup>53</sup> [http://www.fhwa.dot.gov/environment/air\\_quality/cmaq/reference/cost\\_effectiveness\\_tables/costeffectiveness.pdf](http://www.fhwa.dot.gov/environment/air_quality/cmaq/reference/cost_effectiveness_tables/costeffectiveness.pdf).

<sup>54</sup> [https://fhwaapps.fhwa.dot.gov/cmaq\\_pub/](https://fhwaapps.fhwa.dot.gov/cmaq_pub/).



The proposed measures in this NPRM are summarized in Table 9 below. The proposed measures are grouped in 490.105(c) to better reference the proposed measures throughout Subpart A.

TABLE 9—SUMMARY OF PROPOSED MEASURES IN THE 3RD NPRM

Measure groups in § 490.105(c)	Proposed performance measures [23 CFR]	Measure applicability [23 CFR]	Metric data source [23 CFR] & collection frequency	Metric reporting	Metric	Measure calculation
NHS Travel time reliability measures [§ 490.105(c)(4)].	Percent of the Interstate System providing for Reliable Travel Times [§ 490.507(a)(1)].	Mainline of the Interstate System [§ 490.503].	NPMRDS or Equivalent [§ 490.103]—5-minute cycle.	Annual metric reporting to HPMS [§ 490.511(d)].	Level of Travel Time Reliability (LOTTTR) [§ 490.511].	Percentage of the Interstate direction-miles of reporting segments with “LOTTTR <1.50” [§ 490.513].
	Percent of the non-Interstate NHS providing for Reliable Travel Times [§ 490.507(a)(2)].	Mainline of the non-Interstate NHS [§ 490.503].	NPMRDS or Equivalent [§ 490.103]—5-minute cycle.	Annual metric reporting to HPMS [§ 490.511(d)].	Level of Travel Time Reliability (LOTTTR) [§ 490.511].	Percentage of the Interstate direction-miles of reporting segments with “LOTTTR <1.50” [§ 490.513].
Peak hour travel time measures [§ 490.105(c)(5)].	Percent of the Interstate System where peak hour travel times meet expectations [§ 490.507(b)(1)].	Mainline of the Interstate System in urbanized areas with a population over 1 million [§ 490.503].	NPMRDS or Equivalent [§ 490.103]—5-minute cycle.	Annual metric reporting to HPMS [§ 490.511(d)].	Peak Hour Travel Time Ratio (PHTTR) [§ 490.511].	Percentage of the non-Interstate NHS direction-miles of reporting segments with “PHTTR <1.50” [§ 490.513].
	Percent of the non-Interstate NHS where peak hour travel times meet expectations [§ 490.507(b)(2)].	Mainline of the non-Interstate NHS in urbanized areas with a population over 1 million [§ 490.503].	NPMRDS or Equivalent [§ 490.103]—5-minute cycle.	Annual metric reporting to HPMS [§ 490.611(d)].	Peak Hour Travel Time Ratio (PHTTR) [§ 490.511].	Percentage of the non-Interstate NHS direction-miles of reporting segments with “PHTTR <1.50” [§ 490.513].
Freight movement on the Interstate System measures [§ 490.105(c)(6)].	Percent of the Interstate System Mileage providing for Reliable Truck Travel Times [§ 490.607(a)].	Mainline of the Interstate System.	NPMRDS or Equivalent [§ 490.103]—5-minute cycle.	Annual metric reporting to HPMS [§ 490.611(d)].	Truck Travel Time Reliability [§ 490.611].	Percentage of the Interstate direction-miles of reporting segments with “Truck Travel Time Reliability <1.50”.
	Percent of the Interstate System Mileage Uncongested [§ 490.607(b)].	Mainline of the Interstate System.	NPMRDS or Equivalent [§ 490.103]—5-minute cycle.	Annual metric reporting to HPMS [§ 490.611(d)].	Average Truck Speed [§ 490.611].	Percentage of the Interstate direction-miles of reporting segments with “Average Truck Speed 50 mph” [§ 490.613].
Traffic congestion measure [§ 490.105(c)(7)].	Annual Hours of Excessive Delay Per Capita [§ 490.707].	Mainline of NHS in urbanized areas with a population over 1 million in Nonattainment or Maintenance for any of the criteria pollutants under the CMAQ program.	NPMRDS or Equivalent [§ 490.103]—5-minute cycle. Traffic volume and population data in HPMS.	Annual metric reporting to HPMS [§ 490.711(f)].	Total Excessive Delay [§ 490.711].	Annual Hours of Excessive Delay per Capita = (Total Excessive delay / (total population of UZA ) [§ 490.713].
On-road mobile source emissions measure [§ 490.105(c)(8)].	Total Emission Reductions for applicable criteria pollutants [§ 490.807].	All Nonattainment and Maintenance areas for CMAQ criteria pollutants [§ 490.803].	CMAQ Public Access System.	CMAQ Public Access System [§ 490.809].	Annual Project Emission Reductions [§ 490.811].	Cumulative emission reduction due to all projects for each of the criteria pollutant or precursor for which the area is in nonattainment or maintenance (PM <sub>2.5</sub> , PM <sub>10</sub> , CO, VOC and NO <sub>x</sub> ). [§ 490.813].

#### Discussion of Section 490.101 General Definitions

In this section, FHWA proposes to define and describe the proposed use of key terms that will be used throughout this NPRM. The first NPRM and the second NPRM included several definitions (full extent, HPMS, measure, metric, National Bridge Inventory (NBI), non-urbanized area, performance period, and target) that are repeated in

this NPRM to clarify the proposed implementation of the performance measures. Please see the docket for the entire listing of proposed definitions and for any additional information.

The FHWA proposes to define “criteria pollutant” in the same way as this term is defined in the general conformity rule at 40 CFR part 93, subpart B (specifically, 40 CFR 93.152). As part of this definition, FHWA

proposes to list the transportation-related criteria pollutants from the transportation conformity rule at 40 CFR 93.102(b)(1).

The FHWA proposes to include a definition for “freight bottleneck” for use in Part 490. A freight bottleneck is a segment of the Interstate System not meeting thresholds for freight reliability and congestion, as identified in section 490.613, and any other locations the

State DOT wishes to identify as a bottleneck based on its own freight plans or related documents.

The FHWA proposes to include a definition for “Full Extent” to delineate data collection methods that utilize a sampling approach versus those that use a continuous form of data collection.

The FHWA proposes to include a definition for “Highway Performance Monitoring System (HPMS)” because it will be one of the data sources used in establishing a measure and establishing a target. The HPMS is an FHWA maintained, national level highway information system that includes State DOT-submitted data on the extent, condition, performance, use, and operating characteristics of the Nation’s highways. The HPMS database was jointly developed and implemented by FHWA and State DOTs beginning in 1974 and it is a continuous data collection system serving as the primary source of information for the Federal Government about the Nation’s highway system. Additionally, the data in the HPMS is used for the analysis of highway system condition, performance, and investment needs that make up the biennial Condition and Performance Reports to Congress. These Reports are used by the Congress in establishing both authorization and appropriation legislation, activities that ultimately determine the scope and size of the Federal-aid highway program. Increasingly, State DOTs, as well as the MPOs, have utilized the HPMS as they have addressed a wide variety of concerns about their highway systems.<sup>55</sup> Numerous State DOTs and some MPOs use HPMS data and its analytical capabilities for supporting their condition/performance assessment, investment requirement analysis, strategic, and State planning efforts, etc.

The FHWA proposes to define “mainline highway” to limit the extent of the highway system to be included in the scope of the proposed pavement performance measures. The proposed definition for mainline highway includes the primary traveled portion of the roadway and excludes ramps, climbing lanes, turn lanes, auxiliary lanes, shoulders, and non-normally traveled pavement surfaces.

The FHWA proposes to include a definition for “measure” because establishing measures is a critical element of an overall performance management approach and it is important to have a common definition

that FHWA can use throughout the Part. To have a consistent definition for “measure,” FHWA proposes to make a distinction between “measure” and “metric.” Hence, FHWA proposes to define “metric” as a quantifiable indicator of performance or condition and to define “measure” as an expression based on a metric that is used to establish targets and to assess progress toward achieving the established targets.

The FHWA proposes to include a definition of the “National Performance Management Research Data Set (NPMRDS)” because use of this FHWA-furnished data set by States and MPOs is proposed for calculating metrics to assess: Performance of the Interstate System and non-Interstate NHS in Subpart E; freight movement on the Interstate System in Subpart F; and traffic congestion for the purpose of carrying out the CMAQ Program in Subpart G. The FHWA’s proposed definition of the NPMRDS is a data set derived from vehicle-based probe data that includes average travel times representative of all segments of the NHS for all traffic and for freight traffic. It is important to note that for the purpose of this rulemaking, the freight measures require the use of the freight traffic travel times that are representative of freight trucks for those segments that are on the Interstate System only. The NPMRDS includes freight trucks for all segments of the NHS. Segments are defined by the Traffic Message Channel (TMC) location referencing system used by private sector probe data providers. Segment lengths are typically set as the distance between interchanges, intersections, etc., on roadways, and can be as small as 1/10th of a mile or longer than 10 miles, depending on location. The data set contains records that include average travel times for every 5 minutes of every day (24 hours) of the year, recorded and calculated for every travel time segment where probe data is available. The NPMRDS does not include any imputed travel time data (*i.e.*, data that is not from actual observations such as that derived from historical data for similar days/times). The NPMRDS is used by FHWA to research and develop transportation system performance measures and information related to mobility, including travel time, speed, and reliability. Each travel time segment in the NPMRDS has a maximum of 105,408 5-minute average travel time data points annually.<sup>56</sup> Monthly

updates to the NPMRDS are made available to State DOTs and MPOs by the middle of the month following collection (*e.g.*, February 2015 data would be available around March 15, 2015). Each NPMRDS segment is identifiable via a unique geographic location reference called a TMC code. The TMC codes are used by most private sector mapping companies and data providers. Any State DOT or MPO using NPMRDS data has the option to use the TMC coding system to match the NPMRDS segment-level data to the State DOT or MPO’s own NHS location referencing system. The FHWA believes use of a national travel time data set by States or MPOs will yield the best data consistency across the States and MPOs and provide for total coverage of the NHS.

The FHWA proposes to include a definition for “non-urbanized areas” to provide clarity in the implementation of the provision in 23 U.S.C. 150(d)(2) that allows the State DOTs the option of selecting different targets for “urbanized and rural areas.” As written, the statute is silent regarding the small urban areas that fall between “rural” and “urbanized” areas. Instead of only giving the State DOTs the option of establishing targets for “rural” and “urbanized” areas, FHWA proposes to define “non-urbanized” area include a single geographic area that includes all “rural” areas and small urban areas that are larger than “rural” areas but do not meet the criteria of an “urbanized area” (as defined in 23 U.S.C. 101(a)(34)). This would then allow State DOTs to establish different targets throughout the entire State for urbanized areas and a target for a non-urbanized area. For target establishment purposes, FHWA believes that these small urban areas are best treated with the “rural” areas, as non-urbanized areas, because both of these areas do not have the same complexities that come with having the population and density of urbanized areas and are generally more rural in characteristic. In addition, neither of these areas are treated as MPOs in the transportation planning process or given the authority under MAP-21 to establish their own targets.

The FHWA proposes to include a definition for “Performance period” to establish a definitive period of time during which condition/performance would be measured, evaluated, and reported. The frequency of measurement and target establishment for the measures proposed to implement 23 U.S.C. 150 is not directly or indirectly defined in statute. The FHWA proposes a consistent time period of 4 years that would be used to assess non-safety

<sup>55</sup> Highway Performance Monitoring System, FHWA Office of Policy Information. <http://www.fhwa.dot.gov/policyinformation/hpms/nahpms.cfm>.

<sup>56</sup> Estimate based on 12 records per hour, 24 hours per day, and 366 days in the longest year that could occur.

condition/performance. This time period aligns with the timing of the biennial performance reporting requirements under 23 U.S.C. 150(e) and is consistent with a typical planning cycle for most State DOTs and MPOs (e.g., State and MPO transportation improvement programs are required to cover a 4-year period; metropolitan plans are also required to be updated every 4 or 5 years). The proposed calendar year basis is consistent with data reporting requirements currently in place to report pavement and bridge conditions, which are also done on a calendar year basis. For the measures in section 490.105(c)(1) through (c)(7) in Parts C through G, FHWA proposes a definition for "Performance period" that would cover a 4-year period beginning on January 1 of the calendar year in which State DOT targets are due to FHWA, as discussed in section 490.105. For the on-road mobile source emission measure in section 490.105(c)(8) in Part H, FHWA proposes a definition for "Performance period" that would cover a 4-year period beginning on October 1st of the year prior in which State DOT targets are due to FHWA, as discussed in section 490.105. Please refer to section 490.105(e)(4) for more details. Within a performance period, condition/performance would be measured and evaluated to: (1) Assess condition/performance with respect to baseline condition/performance; and (2) track progress toward the achievement of the target that represents the intended condition/performance level at the midpoint and at the end of that time period. The term "Performance period" applies to all proposed measures in Parts C through H. The proposed measures for the HSIP provided for in section 490.209 in Part B where FHWA proposed a 1 calendar year period as the basis for measurement, target establishment and reporting.

The FHWA proposes to include a definition of "Reporting Segment" because, with FHWA's approval, State DOTs and MPOs may choose to combine individual Travel Time Segments (such as the TMC codes referenced in the prior paragraph) into longer, contiguous reporting segments. The FHWA's proposed definition of "Reporting Segment" is the length of roadway that is comprised of one or more contiguous Travel Time Segments that the State DOT and MPOs coordinate to define for metric calculation and reporting.

The FHWA proposes to include a definition for "target" to indicate how measures will be used for target

establishment by State DOTs and MPOs to assess performance or condition.

The FHWA proposes to include a definition of "Transportation Management Area (TMA)" consistent with the definition in 23 CFR 450.104.

The FHWA proposes to include a definition of "Travel Time Data Set" because in the event that either (1) NPMRDS data is unavailable, or (2) a State DOT requests, and FHWA approves the use of an equivalent data set, then the approved equivalent set of travel time data can be used to calculate metrics to assess performance of the Interstate System and non-Interstate NHS, freight movement on the Interstate System, and traffic congestion for the purpose of carrying out the CMAQ Program. The FHWA's proposed definition of "Travel Time Data Set" is either the NPMRDS or an FHWA-approved equivalent data set that is used to carry out the requirements in Subparts E, F, and G of Part 490.

The FHWA proposes to include a definition of "Travel Time Reliability" since this term is used to describe proposed measures for the performance of the Interstate System and non-Interstate NHS and for freight movement on the Interstate System. The FHWA's proposed definition for Travel Time Reliability is consistency or dependability of travel times from day to day or across different times of the day. The definition is based on one that FHWA has used in prior research and studies. The FHWA believes that Travel Time Reliability is important to many transportation system users, including vehicle drivers, public transit riders, and freight shippers. All of these users value Travel Time Reliability, or consistent travel times, more than average travel time because it provides reliability and efficiency when planning for trip times.

The FHWA's proposed definition of "Travel Time Segment" is a set length, which is contiguous, of the NHS for which average travel time data are summarized in the Travel Time Data Set (in the NPMRDS, this would be the TMC codes).

The FHWA proposes to incorporate definitions for "attainment area," "maintenance area," "metropolitan planning organization (MPO)," "National Ambient Air Quality Standards (NAAQS)," "nonattainment area," and "Transportation Management Area (TMA)" as these terms are defined in the Statewide and Nonmetropolitan and Metropolitan Transportation Planning Regulations in 23 CFR 450.104.

Discussion of Section 490.103 Data Requirements

The FHWA is proposing in section 490.103 data requirements that apply to more than one subpart in Part 490. Additional proposed data requirements that are unique to each subpart are included and discussed in their respective subpart.

In this section, FHWA is proposing that State DOTs would submit urbanized area boundaries in accordance with the HPMS Field Manual. The boundaries of urbanized areas would be as identified through the most recent U.S. Decennial Census unless FHWA approves adjustments to the urbanized area, as submitted by State DOTs and allowed for under 23 U.S.C. 101(a)(34). These boundaries would be maintained in the HPMS and used to calculate measures that are applicable to specific urbanized areas or to assess State DOT progress toward the achievement of targets established for urbanized and non-urbanized areas. These boundaries are to be reported to HPMS in the year the State DOT Baseline Performance Report is due (required in section 490.107(b)), and are applicable to the entire performance period (defined in section 490.101 and described in section 490.105(e)(4)), regardless of whether or not FHWA approved adjustments to the urbanized area boundary during the performance period. The FHWA proposes that the State DOT submitted boundary information would be the authoritative data source for the target scope for the additional targets for urbanized and non-urbanized areas (section 490.105(e)(3)), and progress reporting (section 490.107(b)) for the measures identified in section 490.105(c). As discussed in section 490.105(d)(3), any changes in urbanized area boundaries during a performance period would not be accounted for until the following performance period. The FHWA approved urbanized area data available in HPMS on June 15th (HPMS due date) prior to the due date of the Baseline Performance Report is to be used for this purpose. For example, State DOTs shall submit their first Baseline Performance Period Report to FHWA by October 1, 2018. The FHWA approved urbanized area data available in HPMS on June 16, 2018, is to be used.

In section 490.103(c), FHWA is proposing that the boundaries for the nonattainment and maintenance areas be identified for the entire performance period as they are designated and reported by the EPA under the NAAQS for any of the criteria pollutants applicable under the CMAQ program.



The nonattainment and maintenance area would be based on the effective date of EPA designations as published in the **Federal Register** at 40 CFR part 81. States may also want to review EPA's "Green Book"<sup>57</sup> Web site that provides an easy to search tool by pollutant of EPA designations and links to the associated **Federal Register** Notices. The EPA's "Green Book" is updated about twice per year, so States should also check with their local FHWA division office to ensure they have a complete list of all nonattainment and maintenance areas for the performance period. Any changes in the nonattainment or maintenance areas in a State during a performance period would not be accounted for until the following performance period.

In section 490.103(d), FHWA proposes that State DOTs would continue to submit NHS limit data in accordance with HPMS Field Manual. The FHWA proposed that the State DOT submitted NHS information would be the authoritative data source for determining measure applicability (section 490.105(c)), target scope (section 490.105(d)), progress reporting (section 490.107(b)), and determining significant progress (section 490.109(d)) for the measures identified in section 490.105(c)(1) through (c)(7). As discussed in section 490.105(e)(3)(i), the NHS limits dataset referenced in the Baseline Performance Report is to be applied to the entire performance period, regardless of changes to the NHS approved and submitted to HPMS during the performance period.

Depending on when the final rule for this proposal is effective, FHWA plans to determine and publish which State DOTs and MPOs are required to establish targets for each of the proposed measures in Subparts C through H 1 year prior to State DOT's reporting of the targets for the first performance period. The FHWA plans to make the determination based on the following information: Population data from the latest Decennial Census from the U.S. Census Bureau, NHS data from HPMS, and the EPA designated nonattainment and maintenance area published in the **Federal Register** at 40 CFR part 81<sup>58</sup> at the time of determination. Based on this information, FHWA plans to publish a list on its Web site of State DOTs and

MPOs meeting the target establishment requirements for Subparts C–H. Please refer to the discussions for sections 490.105(d), 490.105(e)(1), and 490.107(b)(1).

Beginning with the second performance period and continuing with each performance period thereafter, at the start of each performance period, FHWA will extract the population data from the latest Decennial Census from the U.S. Census Bureau, NHS data from HPMS, and the EPA designated nonattainment and maintenance areas published in the **Federal Register** at 40 CFR part 81, to determine which State DOTs and MPOs are required to establish targets for each of the proposed measures in Subparts C–H, for that performance period. Based on this information, and at the start of each performance period, FHWA plans to publish a list on its Web site of State DOTs and MPOs meeting the target establishment requirements for Subparts C–H.

In section 490.103(e), FHWA is proposing for State DOTs and MPOs to use the NPMRDS data to calculate the metrics defined in sections 490.511, 490.611, and 490.711 to ensure all data used by State DOTs to calculate travel time and speed related metrics are consistent and complete. If more detailed and accurate travel time data exists locally, FHWA is proposing that this data could be used in place of, or in combination with the NPMRDS, provided it is first approved by FHWA.

The NPMRDS is a data set that includes travel times representative of all traffic using the highway system, including a breakdown of travel times of freight vehicles and passenger vehicles. Travel times are recorded on contiguous segments of roadway covering the entire mainline NHS. For the NPMRDS the sources of vehicle probes could include mobile phones, vehicle transponders, and portable navigation devices. Within this data set, the average travel time derived from all vehicle probes traversing each Travel Time Segment is recorded for every 5 minute period throughout every day of the year. This recorded average travel time is referenced as being stored in a "5 minute bin" in this rulemaking. Travel times are only included in the data set if during the 5 minute interval vehicle probes were present to measure travel speeds; consequently, there are no imputed (averaged from similar historical travel periods or estimated) travel times in the data set. The NHS data used in the NPMRDS dataset will be extracted from HPMS on August 15 each year. State DOTs are to provide the necessary NHS information to HPMS in

accordance with the HPMS Field Manual. States should make every effort to submit NHS data to HPMS in a timely manner to ensure the NPMRDS dataset is as complete as possible. The NPMRDS is provided monthly and made available to State DOTs and MPOs for their use in managing the performance of the highway system. The FHWA expects to continue to provide for this data at a national level and to make it available to State DOTs and MPOs to ensure the data consistency and coverage needed to assess system performance at a national level.

The FHWA recognizes that some State DOTs and MPOs have developed robust programs to manage system operations, including collection of travel time data that may be more appropriate and effective to use as an alternative source to the NPMRDS. Considering this, FHWA is proposing that State DOTs and MPOs may utilize alternative data sources, referred to hereafter as "equivalent data source(s)," to calculate the travel time metrics proposed in this rulemaking provided the alternative data source is at least "equivalent" in the design and structure of the data as well as extent of coverage both spatially and temporally to the NPMRDS to ensure for consistency in performance assessment at a national level. The FHWA expects that the travel time data set could include a combination of equivalent data source data and NPMRDS data, as long as the combination covers the full NHS. The FHWA is also proposing that State DOTs request and receive approval from FHWA to use equivalent data source(s), to ensure data quality is maintained. The same travel time data for each travel time segment must be used by both State DOTs and MPOs in all measure calculation (in other words, the following must not happen: The State DOT uses NPMRDS and the MPO uses an equivalent data source for the same travel time segment). The FHWA expects that State DOTs and MPOs will work collaboratively to come to agreement on the data sources to use to meet the requirements proposed in this rulemaking.

The FHWA is proposing in section 490.103(e) that the use of equivalent data source(s) be requested by State DOTs and approved by FHWA before the beginning of a performance period. The FHWA anticipates that State DOTs could change their data source during a performance period, recognizing that over this period a State DOT may elect to use an equivalent data source(s) or change back to the NPMRDS based on future data options, quality, and availability. The FHWA is proposing

<sup>57</sup> See <http://www.epa.gov/oar/oaqps/greenbk/index.html>.

<sup>58</sup> States may also use EPA's "Green Book" (<http://www.epa.gov/oar/oaqps/greenbk/index.html>) as a reference to check the status of EPA designations and find links to the associated **Federal Register** Notices.

that State DOTs limit requests for the use of equivalent data sources to no more frequently than once per calendar year, and only include requests for data to be collected beginning on January 1 of the calendar year following the request. The request to use equivalent data source(s) would need to be submitted no later than October 1 prior to the beginning of the calendar year in which the data would be used to calculate metrics. The FHWA would need to approve the use of the equivalent data source(s) prior to implementation and use by a State DOT.

For example, a State DOT can elect to use the NPMRDS for the first performance period (anticipated to begin on January 1, 2018). If the State DOT acquires the resources to collect more accurate and complete data in 2019, the State DOT would need to submit a request for FHWA's approval of the equivalent data source(s), including the travel time segment(s) it is being used on, no later than October 1, 2019, and FHWA would have to approve its use. The State DOT could then use the FHWA approved equivalent data source(s) to calculate the travel time and speed metrics beginning on January 1, 2020.

The FHWA is proposing that for each performance year, the same data sources (*i.e.*, NPMRDS or equivalent data is used for the same travel time segments for all referenced measures) be used to calculate the annual metrics proposed in subparts E, F, and G. The State DOT reporting of metrics to the HPMS proposed in subparts E, F, and G allow the State DOT to reference the reporting segments by either the NPMRDS TMC code or by HPMS location referencing. It is important to note that if a State DOT elects to use an approved equivalent data source they would be required to submit metrics using HPMS location referencing as FHWA would only have the ability to conflate NPMRDS TMC codes to the HPMS roadway network and not TMC codes used in other travel time data sources.

The FHWA is proposing for State DOTs to establish, in coordination with applicable MPOs, and submit reporting segments as discussed in section 490.103 of this rulemaking. State DOTs and MPOs must use the same reporting segment for the purposes of calculating the metrics and measures proposed in subparts E, F, and G.

The State DOT and MPO must use the same reporting segments for all subparts. Several measures would use the information calculated from the reporting segments and convert segment length into mileage to calculate the

actual measure, which is described in more detail for each specific measure.

Reporting segments would be distinct sections of roadway that could include one or more contiguous travel time segments. This requirement is being proposed as FHWA anticipates that State DOTs would prefer to join shorter travel time segments into more logical lengths of roadway for reporting purposes. To maintain the granularity needed to capture performance changes, FHWA is proposing that in urbanized areas, reporting segments would not exceed  $\frac{1}{2}$  mile in length unless a single travel time segment is longer in length, and in non-urbanized areas, would not exceed 10 miles in length unless a single travel time segment in the travel time data is longer in length. If a single travel time segment in the travel time data is longer than a  $\frac{1}{2}$  mile in length in urbanized areas or 10 miles in length in non-urbanized areas, the reporting segment would be the length of that single travel time segment.

In order to ensure that the reporting segments cover the complete NHS within a State, FHWA is proposing that the reporting segments be continuous and cover the full extent of the mainline highways of the NHS. The FHWA considered alternative approaches to defining reporting segments that would represent roadway key corridors to show travel time performance for the Interstate System and non-Interstate NHS. Although FHWA believes that corridor level evaluations are effective in managing system operations, we did not feel that a corridor based approach could be designed and implemented in manner that would provide for the consistency and reliability needed to report on performance at a State and national level. For this reason, FHWA is proposing that the reporting segments represent 100 percent of the mainline highways on the NHS applicable to the measures in subparts E, F, and G.

Although the State DOTs would be the entity required to submit reporting segments, MPOs would need to coordinate with State DOTs on defining these reporting lengths for those roadways that are within the portion of the metropolitan planning area included within the State boundary. In addition, it is recommended that States DOTs coordinate with any local transportation operating agencies that have influence over the management of traffic operations in making the final decision on reporting segment lengths.

In section 490.103(g), FHWA is proposing that the State DOT would submit its reporting segments to FHWA no later than November 1, prior to the beginning of the calendar year in

which they will be used. These reporting segments would be used throughout the performance period. If the State DOT requests and FHWA approves an equivalent travel time data source during the performance period, the State DOT would need to submit a new set of reporting segments that would correspond to the new travel time data source segmentation. These reporting segments are to be submitted to FHWA by November 1 prior to the beginning of the calendar year in which they will be used. For the purposes of carrying out the requirements proposed in Subpart E, FHWA is proposing that the State DOT submit the travel times desired for each reporting segment that is fully included within urbanized areas with populations over 1 million during the peak period travel times (both morning and evening). The FHWA is proposing that State DOTs would submit reporting segments and the desired travel times to HPMS. The FHWA intends to issue additional guidance on how State DOTs could report these data to HPMS. Finally, the State DOT would be required to submit documentation to demonstrate the applicable MPOs' agreement on the travel time data set used, the defined reporting segments, and the desired travel times.

#### Discussion of Section 490.105 Establishment of Performance Targets

Performance target requirements specific to HSIP-related measures would be established in accordance with section 490.209 of the first performance management NPRM; and performance target requirements specific to pavement condition measures in sections 490.307(a) and bridge condition measures in sections 490.407(c) are included in the second performance management NPRM. The discussions specific to those measures will not be repeated in this NPRM. For additional information, please see the docket for the proposed regulatory text for Part 490, in its entirety that covers both prior NRPMs.

The declared policy under 23 U.S.C. 150(a) transforms the Federal-aid highway program and encourages the most efficient investment of Federal transportation funds by refocusing on national transportation goals, increasing accountability and transparency in the Federal-aid highway program, and improving investment decisionmaking. To this end, FHWA encourages State DOTs and MPOs to establish targets that would support the national transportation goals while improving investment decisionmaking processes.



A number of considerations were raised during the performance management stakeholder outreach sessions regarding target establishment, such as: Providing flexibility for State DOTs and MPOs, coordinating through the planning process, allowing for appropriate time for target achievement, and allowing State DOTs and MPOs to incorporate risks. Using these considerations, FHWA created a set of principles to develop an approach to implement the target establishment requirements in MAP-21. These principles aimed to develop an approach that:

- Provides for a new focus for the Federal-aid program on the MAP-21 national goals under 23 U.S.C. 150(b);
- improves investment and strategy decisionmaking;
- considers the need for local performance trade-off decisionmaking;
- provides for flexibility in the establishment of targets;
- allows for an aggregated view of anticipated condition/performance; and
- considers budget constraints.

In section 490.105, FHWA proposes the minimum requirements for State DOTs and MPOs to follow in the establishment of targets for all measures identified in section 490.105(c), which include the proposed measures both in this performance management NPRM and the second performance management NPRM. This regulatory text, in its entirety, can be found in the docket. These requirements are being proposed to implement the 23 U.S.C. 150(d) and 23 U.S.C. 134(h)(2) target establishment provisions in a manner that provides for the consistency necessary to evaluate and report progress at a State, MPO, and national level, while also providing a degree of flexibility for State DOTs and MPOs.

The FHWA proposes in section 490.105(a) for State DOTs and MPOs to establish targets for each performance measure identified in section 490.105(c). In section 490.105(b), the performance targets for carrying out the HSIP would be established in accordance with section 490.209 of the first performance management NPRM.

In section 490.105(c), FHWA proposes that State DOTs and MPOs that include, within their respective geographic boundaries, any portion of the applicable transportation network or projects would establish performance targets for the performance measures identified in Subparts C through H. The transportation network or geographic areas applicable to each measure is specified in Subparts C through H under sections 490.303, 490.403, 490.503, 490.603, 490.703, and 490.803,

respectively. It is possible that for some measures, the applicable transportation network or geographic area may not be contained within the State or metropolitan planning area geographic boundary. In these cases State DOTs and MPOs would not be required to establish targets. The performance target requirements established by Congress in 23 U.S.C. 135(d)(2)(B)(i)(I) and 23 U.S.C. 134(h)(2)(B)(i)(I) require State DOTs and MPOs to establish targets for the measures described in 23 U.S.C. 150(c), where applicable. Consequently, State DOTs and MPOs are only required to establish targets where their respective geographic boundary contains portions of the transportation network or geographic area that are applicable to the measure. For example, the proposed measure Percent of the Interstate System providing for Reliable Travel Times specified in section 490.507(a)(1) is applicable, as proposed in section 490.503(a)(1), to “mainline highways on the Interstate System.” In this example, if Interstate System mainline highways are not contained within the boundary of an MPO’s metropolitan planning area the measure would not be applicable to that MPO. As a result, that MPO would not be required to establish a target for the proposed measure Percent of the Interstate System providing for Reliable Travel Times specified in section 490.507(a)(1).

The FHWA proposes in section 490.105(d)(1) that State DOTs establish statewide targets that represent performance outcomes of the transportation network or geographic area within their State boundary, and MPOs establish targets that represent performance outcomes of the transportation network or geographic area within their respective metropolitan planning area for the proposed NHS travel time reliability measures (section 490.507(a)), freight movement on the Interstate System measures (section 490.607), and on-road mobile source emissions measure (section 490.807). State DOTs and, if applicable, MPOs are encouraged to coordinate their target-establishment with neighboring States and MPOs to the extent practicable.

The FHWA proposes in section 490.105(d)(2) that State DOTs and MPOs would establish a single urbanized area target, as described in sections 490.105(e)(8) and 490.105(f)(4), respectively, that would represent the performance of the transportation network in each area applicable to the peak hour travel time measures (section 490.507(b)) and traffic congestion measure (section 490.707) as proposed in sections 490.503(a)(2) and 490.703,

respectively. The applicable areas for the peak hour travel time measures are proposed to be urbanized areas with a population greater than 1 million. A subset of these areas would be applicable to the traffic congestion measure: Those areas that also contain any part of an area designated as nonattainment or maintenance for any of the criteria pollutants applicable under the CMAQ program. Based on the 2010 U.S. Census,<sup>59</sup> the peak hour travel time measures would be applicable to the transportation network in 42 urbanized areas of which 33 of these areas (based on the effective date of EPA’s most recent designations in 40 CFR part 81) would apply to the traffic congestion measure. The FHWA believes that this proposed approach of limiting the applicability of the peak hour travel time and traffic congestion measures is needed to focus performance measurement and reporting on only those areas in the United States where transportation demand can have a considerable impact on performance and where the planning and management of system operations are critical to the achievement of improved outcomes. The FHWA also believes that the State DOTs and MPOs in these larger urbanized areas have the experience and capability needed to meet these performance requirements.

In section 490.105(d), FHWA recognizes that there is a limit to the direct impact the State DOT and the MPO can have on the performance outcomes within the State and the MPO, respectively, and recognizes that the State DOT and the MPO need to consider this uncertainty when establishing targets. For example, some Federal and tribal lands include roads and bridges on the NHS that State DOTs would need to consider (as appropriate) when establishing targets. The FHWA anticipates that State DOTs and MPOs would need to consult with relevant entities (e.g., relevant MPOs, State DOTs, local transportation agencies, Federal Land Management Agencies, tribal governments) as they establish targets to better identify and consider factors outside of their direct control that could impact future condition/performance.

The FHWA also recognizes that the limits of the NHS could change between the time of target establishment and the time of progress evaluation and reporting for the targets for measures specified in sections 490.105(c)(1)

<sup>59</sup> Urbanized Area Boundary Data: 2010 TIGER/ LINE Shapefile published by the U.S. Census Bureau (Accessed on 8/7/2013): <ftp://ftp2.census.gov/geo/tiger/TIGER2010/UA/2010/>.



through (c)(7). State DOTs may request modifications to the NHS, which could result in additions, deletions, or relocations. Such changes may alter the measures reported, which could then impact how an established target relates to actual measured performance. For example, if NHS limits are changed after a State DOT establishes the target, actual measured performance of the transportation network within the changed NHS limits would represent a different set of highways as compared to what was originally used to establish the target. This difference could impact a State DOT's ability to make significant progress for targets. Thus, for establishing targets for NHS, FHWA believes that it will be important for the State DOT to ensure that the data used to establish the targets is accessible, and the information about the data is properly documented. Consequently, FHWA proposes in section 490.105(d)(3) that State DOTs must declare and describe the extent of the NHS used for target establishment. The FHWA also proposes that State DOTs declare and describe their urbanized area boundaries. This information would be included, along with reporting targets, in the Baseline Performance Period Report described in section 490.107(b)(1). These NHS limits and urbanized area boundaries are to be reported to HPMS in the year the Baseline Performance Report is due, and are applicable to the entire performance period, regardless of whether or not FHWA approved adjustments to the NHS limits during the performance period. Any changes in NHS limits or urbanized area boundaries during a performance period would not be accounted for until the following performance period.

In section 490.105(e), FHWA proposes the State DOT requirements for the establishment of targets for all measures identified in section 490.105(c), with applicable transportation network for those targets (target scope) defined in section 490.105(d). As defined in section 490.101, a target is a numeric value that represents a quantifiable level of condition/performance in an expression defined by a measure. The FHWA proposes that a target would be a single numeric value representing the intended or anticipated condition/performance level at a specific point in time. For example, the proposed measure, Percent of the Interstate System providing for Reliable Travel Times (in section 490.507(a)(1)), would be a percentage of directional mainline highways on the Interstate System providing for Reliable Travel Times

(sections 490.503(a)(1) and 490.513(b)) expressed in one tenth of a percent. Thus, FHWA proposes that a target for this measure would be a percentage of directional mainline highways on the Interstate System providing for Reliable Travel Times expressed in one tenth of a percent. As a hypothetical example, a 2-year target and a 4-year target would be 39.5 percent and 38.5 percent, respectively for the proposed measure Percent of the Interstate System providing for Reliable Travel Times.

Pursuant to 23 U.S.C. 150(d)(1) and (e), FHWA proposes in section 490.105(e)(1) that State DOTs would establish targets within 1 year of the effective date of this rule, and for each performance period thereafter the State DOTs would establish and report the targets to FHWA by the due date provided in section 490.107(b)(1). The FHWA is proposing that this rule would have an individual effective date. Accordingly, FHWA anticipates the final rule for this proposal would be effective no later than October 1, 2017. This would provide for at least a 1-year period for States to establish targets so that they can be reported in the first State Biennial Performance Report which would be due to FHWA by October 1, 2018. The FHWA recognizes that if the final rule is effective after October 1, 2017, the due date to report State DOT targets for the first performance period may need to be adjusted. If it becomes clear that the final rule will not be effective until after October 1, 2017, FHWA will consider adjusting the due date in the final rule or issuing implementation guidance that would provide State DOTs a 1-year period to establish and report targets.

The proposed schedule would require the establishment and reporting of targets at the beginning of each performance period or every 4 years. With the exception of the allowance proposed in section 490.105(e)(6), FHWA is proposing that State DOTs will not have the ability to change targets reported for a performance period. Considering this proposed limitation, State DOTs would need to provide for sufficient time to fully evaluate their targets before they are due to be reported to FHWA.

Pursuant to 23 U.S.C. 135(d)(2)(B)(i)(II), FHWA proposes in section 490.105(e)(2) that State DOTs coordinate with relevant MPOs to establish consistent targets, to the maximum extent practicable. The coordination would be accomplished in accordance with 23 CFR 450. The FHWA recognizes the need for State DOTs and MPOs to have a shared vision on expectations for future condition/

performance in order for there to be a jointly owned target establishment process. This coordination is particularly needed for the establishment of the targets for the peak hour travel time and traffic congestion measures since a single target will be established for each applicable<sup>60</sup> urbanized area that would need to be reported identically by each applicable State DOT and MPO. Please refer to sections 490.105(e)(8) and 490.105(f)(4) for discussion on the targets for the peak hour travel time and traffic congestion measures. The FHWA is seeking comment on examples of effective State DOT and MPO coordination. The FHWA is specifically requesting comment on the following questions related to State DOT and MPO coordination in light of the proposed performance management requirements in this rule: What obstacles do States and MPOs foresee to joint coordination in order to comply with the proposed requirements? What mechanisms currently exist or could be created to facilitate coordination? What role should FHWA play in assisting States and MPOs in complying with these proposed new requirements? What mechanisms exist or could be created to share data effectively between States and MPOs? Are there opportunities for States and MPOs to share analytical tools and processes? For those States and MPOs that already utilize some type of performance management framework, what are best practices that they can share?

The FHWA proposes in section 490.105(e)(3) to allow State DOTs to establish additional targets, beyond the required statewide target, for any of the proposed measures for the travel time reliability measures and freight movement on Interstate System measures described in sections 490.507(a) and 490.607, respectively. This is intended to give the State DOT flexibility when setting targets and to aid the State DOT in accounting for differences in urbanized areas and the non-urbanized area. The State DOT could establish additional targets for any number and combination of urbanized areas and could establish a target for the non-urbanized area for any or all of the proposed measures. For instance, a State DOT could choose to establish additional targets for a single

<sup>60</sup> Peak hour travel time measure: Urbanized area with a population greater than 1 million;

Traffic congestion measure: Urbanized area with a population greater than 1 million and also any part of the urbanized area is designated as nonattainment or maintenance for any of the criteria pollutants applicable under the CMAQ Program.

urbanized area, a number of the urbanized areas, or all of the urbanized areas separately or collectively. For State DOTs that want to establish a non-urbanized target, it would be a single target that applies to the non-urbanized area statewide. If the State DOT elects to establish any additional targets, they need to be declared and described in the State Biennial Performance Report just after the start date of a performance period (*i.e.*, Baseline Performance Period Report). For each additional target established, State DOTs would evaluate whether they have made progress toward achieving each target and report on that progress in their biennial performance report in accordance with sections 490.107(b)(2)(ii)(B) and 490.107(b)(3)(ii)(B). The FHWA intends to issue guidance regarding the voluntary establishment of additional performance targets for urbanized areas and the non-urbanized area.

As proposed in section 490.105(e)(3)(v), for some measures State DOTs will not be able to establish additional targets. Since peak hour travel time measures and traffic congestion measures are proposed to apply only to certain urbanized areas<sup>61</sup> (please refer to section 490.105(e)(8) for target establishment discussion for these measures), it would not be appropriate to have additional targets. In addition, FHWA anticipates that State DOTs would focus on managing performance for on-road mobile source emissions for those areas designated as nonattainment and maintenance areas,<sup>62</sup> as discussed in section 490.803, regardless of whether those designated areas are located in urbanized area or in non-urbanized area. Thus, rather than the option for establishing additional targets for urbanized areas and the non-urbanized area, FHWA proposes that State DOTs could establish additional targets for any combination of nonattainment and maintenance areas for the on-road mobile source emissions measure. Please refer to section 490.105(e)(9) for target establishment discussion for on-road mobile source emissions measure.

If a State DOT chooses to establish additional performance targets, it would increase the number of performance

targets that it reports. For example, at a minimum, State DOTs would be required to establish two statewide targets for NHS travel time reliability measures (separate target for each of the two measures identified in section 490.507(a)). If a State DOT chooses to establish additional targets for the two NHS travel time reliability measures for the single largest urbanized area in its State, the State DOT would increase the total number of NHS travel time reliability targets to four (2 required targets + 2 additional urbanized area targets = 4).

For each additional target established, State DOTs would evaluate whether they have made progress toward achieving each target and report on that progress in their biennial performance report in accordance with sections 490.107(b)(2)(ii)(B) and 490.107(b)(3)(ii)(B).

Any additional targets the State DOT chooses to establish would not be subject to the significant progress assessment in section 490.109. Because these additional targets are optional and subcomponents of targets established under section 490.105(d), including them in the significant progress assessment proposed in section 490.109 could result in “double counting” during that assessment. The FHWA believes that excluding these additional targets from the significant progress assessment in section 490.109 provides an opportunity for some flexibility with respect to establishing the targets and may encourage State DOTs to establish these additional targets.

Historically, the Census has defined urbanized areas every 10 years, and these boundaries can be adjusted (see 23 U.S.C. 101(a)(34)). The FHWA recognizes that the urbanized area boundaries and resulting non-urbanized area boundary have the potential to change on varying schedules. Changing a boundary during a performance period may lead to changes in the measures reported for the area, and could impact how an established target relates to actual measured performance. Thus, FHWA proposes that State DOTs would need to describe the urbanized area boundaries and the non-urbanized area boundary in place at the start of a performance period in the Baseline Performance Period Report, and use those same boundaries throughout a performance period. This will eliminate the potential for inconsistencies in the extent of the network used to establish targets and calculate measures in urbanized areas and the non-urbanized area, and provide consistency in reporting established targets for those areas.

The urbanized area boundaries are to be reported to HPMS in the year the Baseline Performance Report is due, and are applicable to the entire performance period, regardless of whether or not FHWA approved adjustments to an area boundary during the performance period for other reasons. Any changes in area boundaries during a performance period would not be accounted for until the following performance period.

The FHWA is seeking comments on this approach for establishing optional additional targets for urbanized areas and the non-urbanized area. The FHWA would also like comments on any other flexibility it could provide to or identify for State DOTs related to the voluntary establishment of additional targets. Some examples include:

- Providing options for establishing different additional targets throughout the State, particularly for the States’ non-urbanized area; and
- Expanding the boundaries that can be used in establishing additional targets (*e.g.*, metropolitan planning area boundaries, city limit boundaries).

As described in section 490.105(f), an MPO would have the option to establish a quantifiable target for their metropolitan planning area. As provided in 23 CFR 450.312, the boundaries of the metropolitan planning area include, at a minimum, the entire existing urbanized area (as defined by the Census Bureau) plus the contiguous area expected to become urbanized within a 20-year forecast period. The FHWA recognizes the challenges in coordinating targets between State DOTs and MPOs, especially in cases where urbanized and metropolitan planning areas cross multiple State boundaries. The FHWA intends for State DOTs and the MPOs to collectively consider boundary differences when establishing both State DOT and MPO targets. For reporting purposes, FHWA expects MPOs to report progress to the relevant State DOT for the entire metropolitan planning area. Multistate MPOs would also be expected to provide the data stratified by State. The FHWA seeks comments on target establishment options and coordination methods that could be used by MPOs and State DOTs in areas where the MPO metropolitan planning area crosses multiple States.

To illustrate the differences in boundaries and how they might be addressed for one of the travel time reliability measures, the following example is provided regarding the target establishment boundary differences that could exist in the State of Maryland today.

- Urbanized Areas: Based on the 2010 Decennial Census, the State of Maryland

<sup>61</sup> Peak hour travel time measure: Urbanized area with a population greater than 1 million;

Traffic congestion measure: Urbanized area with a population greater than 1 million and also any part of the urbanized area is designated as nonattainment or maintenance for any of the criteria pollutants applicable under the CMAQ Program.

<sup>62</sup> Nonattainment or maintenance for any of the criteria pollutants applicable under the CMAQ Program.



contains part or all of 11 urbanized areas. Of these urbanized areas, 5 are shared with neighboring States.

- Metropolitan Planning Areas:

Currently, the State contains part or all of six metropolitan planning areas. Of these areas, four metropolitan planning areas are shared with neighboring States (A map of Metropolitan Planning Areas and Urbanized Areas of the State of Maryland is included in the docket).

- Statewide Urbanized Area Target

Extent: An optional State target for the Percentage of Interstate System lane-miles in Good condition within the State's urbanized areas would represent those portions of the 11 urbanized areas within the geographic boundary of the State of Maryland, in aggregate.

- Single Urbanized Area Target

Extent: An optional urbanized area target for a single urbanized area would represent the anticipated Percentage of Interstate System lane-mileage in Good condition within the identified urbanized area, based on the corresponding boundary described in the Baseline Performance Period Report. In the case of the Hagerstown urbanized area, the target would be established for the portion of the urbanized area in the State of Maryland.

- MPO Target Extent: Each of the six MPOs would establish individual targets for representing the anticipated percentage of the Interstate System providing for Reliable Travel Times within their entire metropolitan planning area, regardless of State boundary. In the case of the Hagerstown—Eastern Panhandle MPO in Maryland/Pennsylvania/West Virginia, the MPO would establish target for the Interstate System providing for Reliable Travel Times within its metropolitan planning boundary that extends beyond Maryland State boundary and into Pennsylvania and West Virginia State boundaries, while the Maryland DOT would establish its target for the area only within its State boundary.

The FHWA is seeking comment on alternative approaches that could be considered to effectively implement 23 U.S.C. 134(h)(2)(B)(i)(I) and 23 U.S.C. 150(d)(2) considering the need for coordination required under 23 U.S.C. 134(h)(2)(B)(i)(II) and 23 U.S.C. 135(d)(2)(B)(i)(II). The FHWA is also requesting comment on whether the regulations should include more information or specificity about how the MPOs and States should coordinate on target establishment. For some measures proposed in this NPRM, MPOs could establish targets up to 180 days after the State DOT establishes its targets.

The FHWA proposes in section 490.105(e)(4) that State DOTs establish targets with a 2-year time horizon (*i.e.*, 2-year target) and a 4-year time horizon (*i.e.*, 4-year target) for each performance period. For the measures in section 490.105(c)(1) through (c)(7) of this section, each performance period, defined in section 490.101, would begin on the January 1 of the year in which the State DOT target is reported (*i.e.*, State DOT Baseline Performance Period Report required in section 490.107(b)(1)) to FHWA and would extend for a duration of 4 years. Additionally, the midpoint of a performance period would occur 2 calendar years after the beginning of a performance period. For the on-road mobile source emission measure identified in section 490.105(c)(8) of this section, each performance period would begin at the start of the Federal fiscal year, on October 1st of the year prior to which the State DOT target is reported in the State DOT Baseline Performance Period Report to FHWA and would extend for a duration of 4 Federal fiscal years. The midpoint of a performance period for the on-mobile source emission measure would occur 2 Federal fiscal years after the beginning of a performance period. For all measures in section 490.105(c)(1) through (c)(7), 2-year targets would represent the anticipated or intended condition/performance level at the midpoint of each respective performance period, and 4-year targets would represent the anticipated or intended condition/performance level at the end of each respective performance period. For the on-road mobile source emission measure in section 490.105(c)(8), 2-year targets would represent the anticipated cumulative emissions reduction for the first 2 years of a performance period, and 4-year targets would represent the anticipated cumulative emissions reduction for the entire performance period. Please refer to section 490.105(e)(9) for discussion on targets for on-road mobile source emission measure. It is important to emphasize that established targets (2-year and 4-year targets for all measures in paragraph (c) of this section) would need to be considered as interim conditions/performance levels that lead toward the accomplishment of longer-term performance expectations in the State DOT's long-range statewide transportation plan<sup>63</sup> and NHS asset management plans.<sup>64</sup>

The FHWA is proposing this definitive performance period while recognizing that planning cycles and

time-horizons for long-term performance expectations differ among State DOTs. The FHWA believes that although differences exist, it was necessary to utilize a 4-year performance period considering the following implementation expectations:

- Provide for a link between the interim, short-term targets (*i.e.*, 2-year and 4-year time horizons) to individual State DOT's long-term performance expectations as part of performance-based planning and programming process;
- Ensure the time horizon is long enough to allow for condition/performance change to occur through the delivery of programmed projects;
- Align the schedule of reporting on targets and the evaluation of progress toward achieving the targets with the biennial performance reporting requirements under 23 U.S.C. 150(e); and

- Report targets using a consistent performance period as part of the evaluation of the State DOT's effectiveness of performance-based planning process to the Congress by October 1, 2017, as required by 23 U.S.C. 135(h).

The FHWA anticipates that the State DOTs would establish targets for the measures listed in section 490.105(c) and report the established targets to FHWA by the statutory deadline for the first biennial report of October 1, 2018.<sup>65</sup> If the final rule is published after September 1, 2016, FHWA will publish guidance to assist State DOTs in complying with Section 150(e) of MAP-21. The FHWA considered a number of alternatives for a consistent time horizon (*i.e.*, performance period) across the State DOTs to ensure consistent reporting of targets and assessment of progress toward achieving those targets for carrying out the requirements in the statutory provisions.<sup>66</sup>

In addition, FHWA considered the data collection and reporting cycles associated with proposed measures. For example, the timeframe of collected data used for calculating a measure for the proposed measures in paragraphs (c)(1) through (c)(7) is on a calendar year basis, but the timeframe of reported data used for calculating a measure for the proposed on-road mobile source emissions measure in paragraph (c)(8) is on a Federal fiscal year basis. The FHWA also assessed the inherent time lag between data collection and target establishment due to necessary data processing, data quality management,

<sup>65</sup> 23 U.S.C. 150(e).

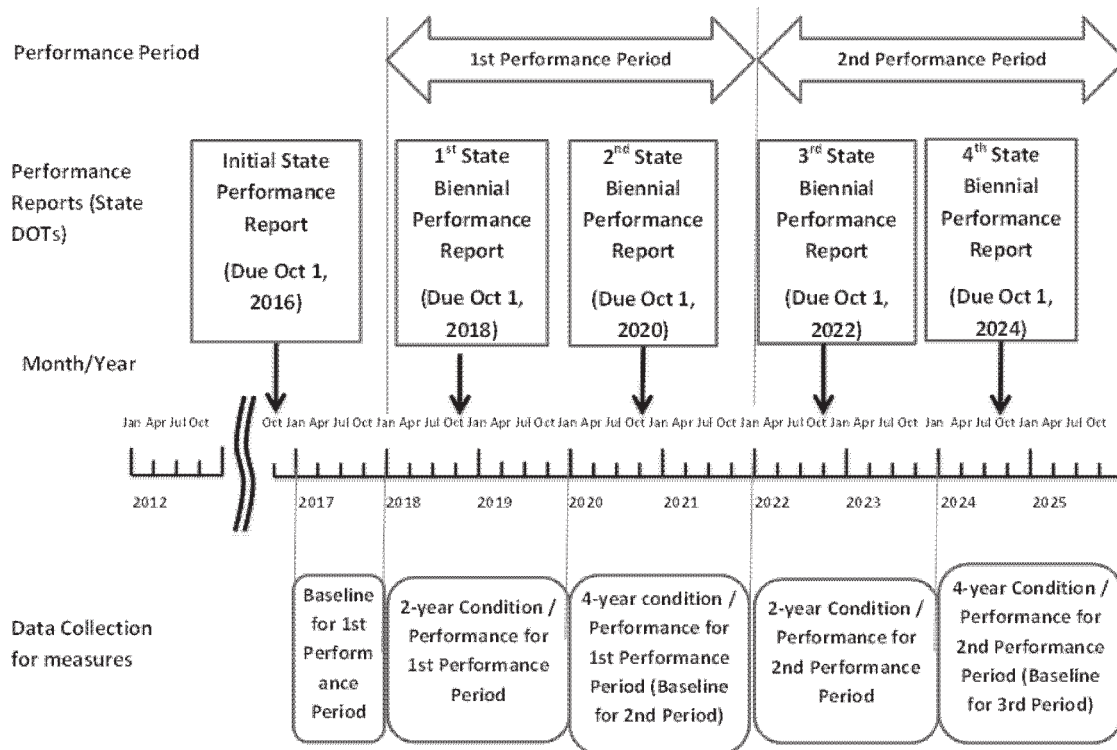
<sup>66</sup> 23 U.S.C. 150(e), 23 U.S.C. 135(h), and 23 U.S.C. 119(e)(7).



data analysis, and other required business processes necessary for target establishment. The FHWA intends to minimize the time lag between the end of a performance period and the time of subsequent biennial performance reporting under 23 U.S.C. 150(e) to ensure a timely assessment of progress toward achieving the targets. Consequently, FHWA proposes two different performance periods—one for the measures in paragraphs (c)(1) through (c)(7) and one for on-road mobile source emissions measure in paragraph (c)(8). The FHWA proposes

that the first 4-year performance period start on January 1, 2018, and end on December 31, 2021, and subsequent performance periods would follow thereafter, for the measures in paragraphs (c)(1) through (c)(7) and first 4-year performance period start on October 1, 2017, and end on September 30, 2021, and subsequent performance periods would follow thereafter, for the measures in paragraph (c)(8). As indicated previously, FHWA plans to align performance periods for the proposed measures in this NPRM (measures in paragraphs (c)(4) through

(c)(7) and the measures proposed in the second performance management measure NPRM<sup>67</sup> (measures in paragraphs (c)(1) through (c)(3)). Diagrams for proposed performance periods for target establishment, condition/performance measure data collection and assessment, and biennial performance reporting are exhibited in Figures 1 and 2. Please see section 490.107(a)(4) for discussion on the Initial State Performance Report, which is due on October 1, 2016.

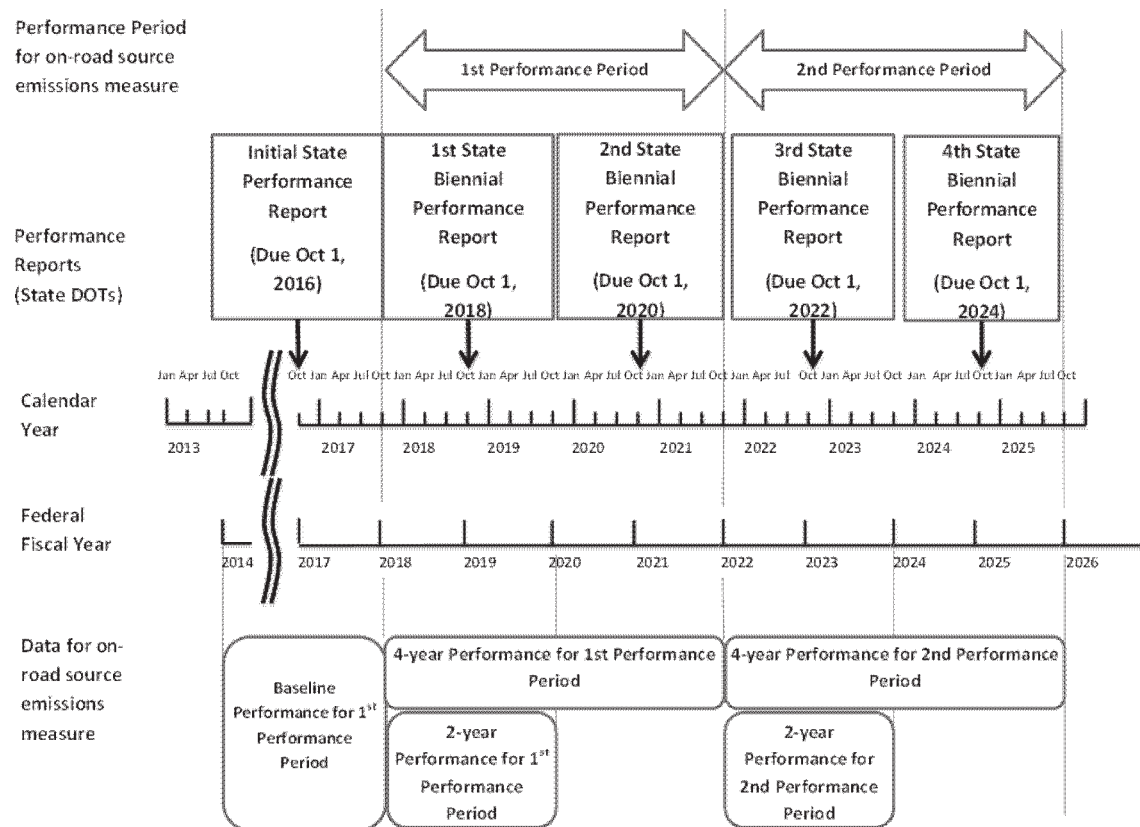


**Figure 1 – Timeline of Performance Periods for All measures Except On-Road Mobile Source Emissions Measure**

<sup>67</sup> Notice of Proposed Rulemaking for the National Performance Management Measures; Assessing Pavement Condition for the National

Highway Performance Program and Bridge Condition for the National Highway Performance Program 80 FR 2014–30085 (published January 5,

2015) <http://www.gpo.gov/fdsys/pkg/FR-2015-01-05/pdf/2014-30085.pdf>.



**Figure 2 – Timeline of Performance Periods for On-Road Mobile Source Emissions Measure**

As shown in Figure 1, for the first performance period for all measures except on-road mobile source emissions measure in paragraph (c)(8), the latest measured condition/performance data through December 31, 2017, is the baseline condition/performance. The State DOTs would establish 2-year targets as the condition/performance anticipated at a midpoint, which would be indicated by the latest measured condition/performance data through the midpoint of the performance period (December 31, 2019, for the first performance period). Similarly, the State DOTs would establish 4-year targets as the condition/performance anticipated at the end of a performance period which would be indicated by the latest measured condition/performance data through the end of the performance period (December 31, 2021, for the first performance period). The FHWA recognizes that the previously programmed projects may have an impact on the target a State DOT establishes for the first performance period. State DOTs should consider the impact of previously programmed projects on future performance

outcomes when establishing their targets.

As illustrated in Figure 2, the latest 4-year cumulative emissions reductions results from CMAQ projects from fiscal year 2014 through fiscal year 2017, is the baseline condition/performance. For the first performance period for the on-road mobile source emissions measure, State DOTs would establish 2-year targets which would reflect the anticipated cumulative emissions reductions resulting from CMAQ projects to be reported in the CMAQ Public Access System (described in section 490.809) for the Federal fiscal years 2018 and 2019. Thus, the 2-year target would be the anticipated sum of total emission reductions in the CMAQ Public Access System for the Federal fiscal years 2018 and 2019 for each criteria pollutant and applicable precursors for which the area is nonattainment or maintenance. Similarly, the State DOTs would establish 4-year targets as the anticipated cumulative emissions reductions resulting from CMAQ projects to be reported in the CMAQ Public Access System for the Federal fiscal years 2018 through 2021. Thus,

the 4-year target would be the anticipated sum of total emission reductions in the CMAQ Public Access System for the Federal fiscal years 2018 through 2021 for each criteria pollutant and applicable precursors for which the area is nonattainment or maintenance. Similar to other measures, FHWA recognizes that the previously programmed CMAQ projects may have an impact on target a State DOT establishes for the first performance period. State DOTs should consider the impact of previously programmed CMAQ projects on future performance outcomes when establishing their targets.

It is important to note that the timeframe of collected data used for calculating a measure depends on the individual measure. Data collection frequency requirements and the timeframe for when State DOTs and MPOs would collect data used for calculating a measure are proposed in the Data Requirement and Calculation of Performance Measure Sections for each measure in the relevant Subparts. This proposed timeline, depicted in Figures 1 and 2, is intended to: (1) Satisfy the first State DOT biennial performance

report due on October 1, 2018, as described in the discussion on section 490.107; (2) accommodate data collection cycles and the timeframe for when State DOTs and MPOs would collect data used for calculating a measure; and (3) minimize the time lag between the end/midpoint of a performance period and the following biennial performance reporting date, as described in the discussion sections in 490.107 and 490.109. Baseline condition and target establishment for subsequent performance periods would follow a similar timeline as the first performance period. The proposed 2-year and 4-year targets are timed so that the targets are on the same cycle as the biennial report under 23 U.S.C. 150(e), and are also necessary for FHWA to determine the significant progress for NHPP and NHFP targets as required under 23 U.S.C. 119(e)(7) and 23 U.S.C. 167(j). The FHWA must make this determination every 2 years, after a State DOT submits each biennial report.

The FHWA proposes in section 490.105(e)(5) that State DOTs report their established targets (2-year and 4-year) and progress toward achieving their targets in the biennial performance report required by 23 U.S.C. 150(e) as specified in section 490.107. As discussed in section 490.105(e)(2), State DOT coordination with relevant MPOs is required for selection of targets. Thus, FHWA proposes that the State DOTs would be able to provide relevant MPOs' targets to FHWA, upon request, each time the relevant MPOs establish or adjust MPO targets as described in section 490.105(f).

The FHWA recognizes that State DOTs would need to consider many factors in establishing targets that could impact progress such as uncertainties in funding, changing priorities, and external factors (see section 490.109(e)(5)) outside the control of the State DOTs.

Thus, FHWA proposes in section 490.105(e)(6) that State DOTs may adjust their established 4-year targets when they submit their State Biennial Performance Report just after the midpoint of the performance period (*i.e.*, Mid Performance Period Progress Report, described in section 490.107(b)(2)). This target adjustment allowance would be limited to this specific report and not be allowed at any other time during the performance period. The FHWA feels that this frequency of adjustment allows a State DOT to address changes they could not have foreseen in the initial establishment of 4-year targets while still maintaining a sufficient level of control in the administrative procedure

necessary to carry out these program requirements in an equitable manner. For example, the 4-year target established in 2018 (the 1st State Biennial Performance Report illustrated in Figures 1 and 2) may be adjusted in 2020 (2nd State Biennial Performance Report illustrated in Figures 1 and 2). The State DOT would report and justify this adjusted target in the second State Biennial Performance Report due in October 2020 (*i.e.*, Mid Performance Period Progress Report). As discussed in section 490.105(d)(2) of this section, FHWA proposes that State DOTs and MPOs would establish a single urbanized area<sup>68</sup> target, as described in section 490.105(e)(8), that would represent the performance of the transportation network in each area applicable to the peak hour travel time and traffic congestion measures. Thus, FHWA proposes that any adjustments made to 4-year targets established for the peak hour travel time and/or traffic congestion measures would be agreed upon and made collectively by all State DOTs and MPOs that include any portion of the NHS in the respective urbanized area applicable to the measure. The details of reporting requirements for adjusting a target are discussed in section 490.107(b)(2).

In section 490.105(e)(7), FHWA proposes a phase-in for the establishment of targets for the non-Interstate NHS travel time reliability measure, provided in section 490.507(a)(2). This phase-in would require only State DOTs to establish 4-year targets for the first performance period for this measure (reported in the 1st State Biennial Performance Report as illustrated in Figure 1) for non-Interstate NHS travel time reliability measure, provided in section 490.507(a)(2). The FHWA is proposing this phase-in to allow sufficient time for State DOTs and MPOs to become more proficient in managing performance of non-Interstate roadways and for the coverage of the data, during peak periods, to become more complete in the NPMRDS. At the midpoint of the first performance period State DOTs would have the option to adjust the 4-year targets they established at the beginning of the performance period in their State Biennial Performance Report (report due in October 2020 as illustrated in Figure 1). This will allow State DOTs to consider

<sup>68</sup> Peak hour travel time measure: Urbanized area with a population greater than 1 million; Traffic congestion measure: Urbanized area with a population greater than 1 million and also any part of the urbanized area is designated as nonattainment or maintenance for any of the criteria pollutants applicable under the CMAQ Program.

more complete data in their decision on the 4-year targets for non-Interstate NHS travel time reliability. Although 2-year targets would not be established in the first performance period, FHWA is proposing that State DOTs still would report metrics annually, as required in section 490.511(d)), for the non-Interstate NHS travel time reliability measure.

Similarly FHWA is proposing to phase-in the reporting of baseline travel time reliability performance for the non-Interstate NHS travel time reliability measure. The FHWA proposes that State DOTs would report baseline performance in the 2nd State Biennial Performance Report in 2020 (instead of the 1st report due in 2018) for non-Interstate NHS travel time reliability. This baseline would represent the performance through the end of 2019 (*i.e.*, 2-year condition/performance). Also, as State DOTs would not be establishing 2-year targets for non-Interstate NHS travel time reliability, FHWA will not evaluate performance progress at the midpoint of the first performance period (discussed further in section 490.109(e)(3)) for this measure.

In section 490.105(e)(8), as discussed in sections 490.507(b) and 490.707, FHWA proposes that the peak hour travel time measure would apply to the roadway transportation network in urbanized areas with a population over 1 million and the traffic congestion measure would include these same areas that also contain areas designated as nonattainment or maintenance areas for any of the criteria pollutants applicable under the CMAQ program. The FHWA proposes that State DOTs, with mainline highways on the Interstate System that cross any part of an urbanized area with a population more than 1 million within its geographic State boundary, would establish a target for peak-hour travel time for the Interstate System for that urbanized area. Similarly, FHWA proposes that State DOTs, with mainline highways on the non-Interstate NHS that cross any part of an urbanized area with a population more than 1 million within its geographic State boundary, would establish a target for peak-hour travel time for the non-Interstate NHS for that urbanized area. The FHWA proposes that if a State DOT is required to establish targets for either of the peak hour travel time measures for an urbanized area and that urbanized area contains any part of a nonattainment or maintenance area for any one of the criteria pollutants, as specified in section 490.703, then that State DOT would also be required establish targets



for the traffic congestion measure. For instance, if a State is in attainment for the applicable criteria pollutants, but that State is part of a multistate urbanized area with more than 1 million in population and another part of that urbanized area contains an applicable nonattainment or maintenance area then the State that is in attainment would be required to work with the other States and establish a traffic congestion target.

In deciding to limit the applicability of these performance measures, FHWA considered a number of factors. In general, the boundary limits of large urbanized areas are representative of population size and density. The FHWA believes that the need to plan for and manage transportation demand is greatest in areas of the country where populations are high and more densely located. The FHWA also believes that in these largest urbanized areas State DOTs and MPOs have the experience and capability needed to plan and manage high levels of transportation demand. For these reasons, FHWA is proposing, as discussed in Subparts E and G, an approach to limit the applicability of the peak hour travel time and traffic congestion measures to only those roadway networks that are contained in very large urbanized areas. The FHWA believes that the MAP-21 statewide and metropolitan target establishment provisions<sup>69</sup> only require State DOTs and MPOs to establish targets where the measure is applicable to them. Because some State DOTs and MPOs do not include these very large urbanized areas, it is highly likely that those State DOTs and MPOs would not be required to establish targets for the peak hour travel time and traffic congestion measures. Based on the 2010 Decennial U.S. Census<sup>70</sup> and a recent EPA designation<sup>71</sup> of nonattainment and maintenance areas, there are 42 urbanized areas in the country where the population is greater than 1 million and of these 33 are designated as nonattainment or maintenance areas. Using these boundaries, 35 State DOTs and 67 MPOs<sup>72</sup> would be required to

establish targets for peak hour travel time measures and 33 State DOTs and 42 MPOs would be required to establish a target for the traffic congestion measure. Based on the data available, FHWA has estimated the State DOTs and MPOs who might be affected by proposed peak hour travel time and traffic congestion measures. A list<sup>73</sup> of those State DOTs and MPOs is included in the docket.

The FHWA is proposing that the applicable areas would be determined at the beginning of a performance period and remain for the duration of the performance period regardless of changes that could result from U.S. Census or EPA designation changes during the performance period.

As population continues to grow there will be an increased potential for large urbanized areas to extend across State borders and/or metropolitan planning area boundaries necessitating an increased level of coordination of multiple entities to plan for and manage transportation demand. The FHWA believes that State DOTs and MPOs should collectively work together to support a common transportation performance vision for the area. The FHWA also believes that, through congestion management planning being done by MPOs serving a TMA as part of the planning process,<sup>74</sup> an increased level of coordination is occurring today, especially in the largest urbanized areas across the country. For this reason, FHWA is proposing in section 490.105(e)(8) that a single, unified target for each of the peak hour travel time measures and a single, unified target for the traffic congestion measure be established for each applicable urbanized area in the country. For each of these urbanized areas, the peak hour travel time and traffic congestion targets would be collectively established by all State DOTs and MPOs that have, within their respective boundaries, any portion of the applicable roadway network in the applicable urbanized area. Consequently, the 2-year and 4-year targets established for peak hour travel time and traffic congestion measures would be reported identically by each State DOT and MPO in the applicable area. Also, under the proposed approach, any adjustments to the 4-year target would be made for the entire applicable urbanized area; resulting in identical reporting of the adjustment by

each State DOT and MPO in the applicable areas. For example, based on the most recent U.S. Census, four State DOTs and four MPOs have non-Interstate NHS mileage within their respective boundaries that are contained within or cross into the Philadelphia Urbanized Area. Although the share of the non-Interstate NHS network varies considerably among the eight entities, each would be required to report the same target that would be developed through a coordinated approach, for the Philadelphia Urbanized Area. In this area any adjustments to the target would also need to be made and agreed upon by all eight entities. The FHWA considered separate State DOT and MPO targets for their share of the transportation network within an urbanized area for the targets for the peak hour travel time and traffic congestion measures. However, FHWA believes that performances related to peak hour travel time and traffic congestion within each entity's geographic boundary within an urbanized area would heavily impact the performances of the surrounding entities in that urbanized area. To encourage an increased level of coordination for effectively managing transportation demand of an urbanized area for these measures, FHWA is proposing a single target for each applicable urbanized area.

State DOTs and MPOs would also be required to establish targets for peak hour travel time and traffic congestion measures for more than one urbanized area if their respective boundaries intersect or include multiple applicable urbanized areas. For example, based on the most recent U.S. Census, Maryland DOT would be required to establish targets for three applicable urbanized areas: Baltimore, Washington, DC, and Philadelphia. As discussed above, the targets established for these three areas would be shared by the other applicable State DOTs and MPOs.

In section 490.105(e)(8)(vi), FHWA proposes a phase-in for the establishment of targets for the traffic congestion measure in section 490.707. As discussed previously for the non-Interstate NHS travel time reliability targets, this phase-in is being proposed to provide sufficient time for State DOTs and MPOs to become more proficient in managing traffic congestion performance and for the travel time data coverage to be more complete in the NPMRDS. The proposed traffic congestion measure requires complete data coverage to capture all excessive delay occurrences throughout the day at a 5-minute level of granularity. In addition, as indicated in section

<sup>69</sup> Target establishment provisions: Statewide 23 U.S.C. 135(d)(2)(B)(i)(I); Metropolitan 23 U.S.C. 134(h)(2)(B)(i)(I).

<sup>70</sup> Urbanized Area Boundary Data: 2010 TIGER/LINE Shapefile published by the U.S. Census Bureau (Accessed on 8/7/2013): <ftp://ftp2.census.gov/geo/tiger/TIGER2010/UA/2010/Population Data for Urbanized Areas> (Accessed on 8/7/2013): <https://www.census.gov/geo/reference/ua/urban-rural-2010.html>.

<sup>71</sup> The status of the nonattainment/maintenance areas was verified on 5/1/2015 based on EPA's Green Book (updated on April 14, 2015): [http://www.epa.gov/oaqps001/greenbk/gis\\_download.html](http://www.epa.gov/oaqps001/greenbk/gis_download.html).

<sup>72</sup> Metropolitan Planning Area Data: FHWA HEPGIS (Accessed on 10/15/2015): <http://>

[hepgis.fhwa.dot.gov/hepgismaps11/ViewMap.aspx?map=MPO+Boundaries\[MPO+Boundary\]#](http://hepgis.fhwa.dot.gov/hepgismaps11/ViewMap.aspx?map=MPO+Boundaries[MPO+Boundary]#).

<sup>73</sup> Documents "Peak Hour Travel Time Measure States and MPOs.pdf" and "CMAQ Measure States and MPOs.pdf" in the docket.

<sup>74</sup> See 23 U.S.C. 134(k)(3).

490.711, the metric for the proposed traffic congestion measure requires the integration of travel time and traffic volume datasets. For these reasons, FHWA believes more time is needed before State DOTs and MPOs can reliably establish meaningful targets for traffic congestion.

The FHWA is aware that the NPMRDS will be lacking data on the non-Interstate NHS roadways in the short-term (missing data is discussed in a white paper provided on the docket). If 2-year targets were to be established in the first performance period, the NPMRDS will be lacking data on the non-Interstate NHS roadways. The FHWA anticipates that enough data would be missing to make it difficult for States to establish reasonable targets. By the time the 2-year condition/performance are calculated, FHWA expects the NPMRDS data to have improved to an acceptable level for this measure. Also, States would have time to understand the impact of missing data on target establishment. Full compliance is required starting from the second performance period. Thus, FHWA proposes that for the first performance period, as with the non-Interstate travel time reliability measure, State DOTs would only be required to establish their 4-year targets for the traffic congestion measure in the beginning of the first performance period (*i.e.*, the 1st State Biennial Performance Report in 2018 illustrated in Figure 1) for the traffic congestion measure. If necessary, State DOTs would adjust their established 4-year targets at the midpoint of the first performance period (*i.e.*, the 2nd State Biennial Performance Report in 2020 illustrated in Figure 1) as described in section 490.105(e)(6). Although 2-year targets would not be established in the first performance period, FHWA is proposing that State DOTs still would report metrics annually, as required in section 490.711(f).

For the first performance period only, the baseline traffic congestion performance would be reported by the State DOT at the midpoint of the performance period in their 2nd State Biennial Performance Report in 2020 (illustrated in Figure 1). This baseline report would represent traffic congestion performance through 2019 (*i.e.*, 2-year condition/performance).

The FHWA proposes in section 490.105(e)(9) the State DOT target establishment requirements for the proposed on-road mobile source emission measure, identified in section 490.807. In paragraph (i) of this section, FHWA proposes that State DOTs would establish a statewide target for all areas

within the State geographic boundaries designated as nonattainment or maintenance for the O<sub>3</sub>, CO, or PM (PM<sub>10</sub> and PM<sub>2.5</sub>) NAAQS.

In section 490.105(e)(9)(ii), FHWA proposes that State DOTs would establish separate statewide targets for each of the applicable criteria pollutant and precursor (PM<sub>2.5</sub>, PM<sub>10</sub>, CO, VOC and NO<sub>x</sub>) for which the State is designated as nonattainment or maintenance, as described in section 490.807.

As proposed in section 490.105(e)(4)(iii) and (e)(4)(iv), the 2-year targets for this measure would reflect the anticipated cumulative emissions reduction to be reported for the first 2 years of a performance period (*i.e.*, total emissions reduced for 2 fiscal years) pollutant and precursor. The 4-year target would reflect anticipated cumulative emissions reduction to be reported for the entire performance period (*i.e.*, total emissions reduced for 4 fiscal years) by pollutant and precursor.

To implement the flexibility in 23 U.S.C. 150(d)(2) that provides State DOTs the option for establishing different targets for different areas of the State and in consideration of the measure that FHWA is proposing for on-road mobile source emissions, FHWA proposes in section 490.105(e)(9)(iv) that State DOTs would have the option of establishing additional targets, beyond the statewide targets, for any number and combination of nonattainment and maintenance areas by applicable criteria pollutant and precursors. For instance, a State DOT could choose to establish additional targets for a single nonattainment and maintenance area and a single applicable criteria pollutant or precursor, a number of areas and applicable pollutants or precursors, or each of the areas and applicable pollutants or precursors separately. A State DOT that has multiple nonattainment and maintenance areas for multiple criteria pollutants could decide to establish a target for one of the areas and for only one of the applicable pollutants or precursors within that area. If a State DOT decides to establish these additional targets, the requirements for these targets are similar to those provided in section 490.105(e)(3). The additional targets would need to be described in the State Baseline Performance Period Report. For each additional target, State DOTs would evaluate whether they have made progress toward achieving the target and report on that progress in their biennial performance report in accordance with

sections 490.107(b)(2)(ii)(B) and 490.107(b)(3)(ii)(B).

In sections 490.105(e)(9)(v) and (e)(9)(vi), FHWA proposes that the State DOT's requirement for establishing target(s) for on-road mobile source emission measure would be by the EPA's nonattainment and maintenance areas designations published in the **Federal Register** in 40 CFR part 81 at the time when the State DOT Baseline Performance Period Report is due to FHWA. States may also use EPA's "Green Book" Web site<sup>75</sup> to check the status of EPA designations. States should also check with their local FHWA division office to ensure they have a complete list of all nonattainment and maintenance areas for the performance period. These designations would be used for the duration of the performance period regardless of subsequent change in designation status during that performance period. In section 490.105(e)(9)(vii), FHWA proposes that if a State geographic boundary does not contain any part of areas designated by the EPA as nonattainment or maintenance for any of the criteria pollutants applicable to the CMAQ Program at the time when the State DOT Baseline Performance Period Report is due to FHWA, then that State DOT is not required to establish targets for on-road mobile source emissions measures for that performance period.

Although both traffic congestion and on-road mobile source emission measures are proposed to carry out the CMAQ Program, there are some differences in how the targets for the measures would be implemented. As discussed in section 490.105(e)(8), the targets for the traffic congestion measure would apply to the NHS roadway network in urbanized areas with a population over 1 million that also contain areas designated as nonattainment or maintenance for any of the criteria pollutants applicable under the CMAQ Program where as the targets for on-road mobile source emission measure would apply to all nonattainment or maintenance areas for any of the criteria pollutants applicable under the CMAQ Program as discussed in section 490.105(e)(9). The FHWA also proposes that a single, unified target for traffic congestion measure would be established for each applicable urbanized area in the country; whereas target(s) for the on-road mobile source emission measure would be bounded by State geographic boundaries and nonattainment or maintenance areas.

<sup>75</sup> See <http://www.epa.gov/oar/oaqps/greenbk/index.html>.



Additionally, as discussed in section 490.105(e)(4), the performance period for the traffic congestion measure would be on a calendar year basis whereas the performance period for the on-road mobile source emission measure would be on a Federal fiscal year basis. Even though there are differences between these measures, FHWA believes both of these measures support two goals of the CMAQ Program: To improve air quality and relieve congestion. Both of these measures also are consistent with the National Goals of environmental sustainability and congestion reduction (23 U.S.C. 150(a)(3) and (a)(6)). In section 490.105(f), FHWA proposes MPO requirements for the establishment of targets for all measures identified in section 490.105(c). These requirements are being proposed to implement the 23 U.S.C. 134(h)(2)(B) target establishment provisions in a manner that provides for a level of consistency necessary to evaluate and report progress at an MPO and national level while providing for a degree of flexibility to support metropolitan planning needs. The FHWA also attempted to develop these target establishment requirements so that they could be met by all MPOs, recognizing that MPOs currently vary in capability, resource availability, and ability to establish performance targets. Given these considerations, FHWA is proposing that MPOs would be required, depending on the measure, to establish both 2-year and 4-year targets or only 4-year targets.

As part of the MPO-State DOT coordination in establishing State DOT and MPO targets described in the discussion of sections 490.105(e)(2) and 490.105(f)(2), FHWA proposes in section 490.105(f)(1) that MPOs establish targets with a 4-year performance period identical to the State DOT's performance periods discussed in the Section-by-Section Discussion for 490.101 and 490.105(e)(4). It is important to emphasize that established MPO targets must be considered as interim conditions/performance levels that lead toward the accomplishment of longer-term performance expectations in the MPO's Metropolitan Transportation Plan<sup>76</sup> and relevant State DOT NHS asset management plans.<sup>77</sup>

The FHWA proposes in section 490.105(f)(1)(i) that each MPO would establish 4-year targets for all applicable measures in section 490.105(c) no later than 180 days after the relevant State DOT establishes its targets, described in

the discussion of section 490.105(e)(1).<sup>78</sup>

The FHWA proposes in section 490.105(f)(1)(ii) that the MPOs with any portion of the applicable roadway network in an urbanized area with a population greater than 1 million would establish both 2-year and 4-year targets for the peak hour travel time measures, as described in section 490.105(f)(4)(i). In addition, the MPOs that have any portion of the applicable roadway network in an urbanized area with a population greater than 1 million and contain areas designated as nonattainment or maintenance would establish both 2-year and 4-year targets for the traffic congestion measure, as described in section 490.105(f)(4)(ii). The FHWA is proposing this approach because, as discussed section 490.105(e)(8), 2-year and 4-year targets established for peak hour travel time and traffic congestion measures would represent the entire urbanized area, and State DOTs and MPOs would report identical targets for each of the applicable urbanized areas. In addition, for the traffic congestion measure, the requirement to have targets every 2 years is consistent with the requirement for these MPOs to report on this target every 2 years under the performance plan requirements of 23 U.S.C. 149(l).

For the on-road mobile source emissions measure, whether an MPO must establish 2-year and 4-year targets or would only be required to establish a 4-year target depends on if the MPO is in an urbanized area with a population greater than 1 million and contains areas designated as nonattainment or maintenance for any of the criteria pollutants applicable to the CMAQ program. An MPO in one of these large urbanized areas would be required to establish both 2-year and 4-year targets for the on-road mobile source emissions measure, as provided in section 490.105(f)(5)(iii). An MPO outside of these large urbanized areas would only be required to establish a 4-year target for the on-road mobile source emissions measure, as required by section 490.105(f)(1)(i); it would not be required to establish a 2-year target as provided in section 490.105(f)(1)(ii). In proposing this approach, FHWA considered that the MPOs in a larger urbanized area would be required to do

biennial reporting on these targets under 23 U.S.C. 149(l).

The FHWA recognizes the burden on MPOs, regardless of size, to establish targets. In addition, MPOs are not directly subject to the requirement to evaluate the progress toward achieving NHPP and NHFP targets under 23 U.S.C. 119(e)(7) and 23 U.S.C. 167(j). As a result, FHWA proposes in section 490.105(f)(1)(iii) that MPOs would not be required to establish 2-year targets for the NHS travel time reliability measures and freight movement on Interstate System measures.

In the case of the first performance period, FHWA anticipates that the State DOTs would establish targets for the measures listed in section 490.105(c) prior to the first State DOT biennial performance report, and the MPOs would establish targets no later than 180 days thereafter. The timeline for target establishment for State DOTs is illustrated in Figures 1 and 2 in the discussion of section 490.105(e)(4). The FHWA recognizes that the previously programmed projects may have an impact on the target an MPO establishes for the first performance period. The MPOs should consider the impact of previously programmed projects on future performance outcomes when establishing their targets. As discussed in section 490.105(e)(4), FHWA recognizes that if the final rule is effective after September 30, 2017, the due date to report State DOT targets for the first performance period may need to be adjusted. If the rule is effective on or after September 30, 2017, MPOs may not have the opportunity to establish their own targets in time for State DOTs to consider those MPO targets when submitting the 1st Baseline Performance Period Report. If it becomes clear that the final rule will not be effective until after September 30, 2017, FHWA will consider adjusting the due date in the final rule or issuing implementation guidance that would provide State DOTs a 1-year period and MPOs 180 days thereafter to establish and report targets. The MPOs would be required to establish targets for all applicable measures.

Similar to the requirement for State DOTs, pursuant to 23 U.S.C. 134(h)(2)(B)(i)(II), FHWA proposes in section 490.105(f)(2) that MPOs coordinate with relevant State DOT(s) to establish consistent targets, to the maximum extent practicable. This would be done in accordance with 23 CFR 450.

The FHWA recognizes the burden on the MPOs to establish their own performance targets. Consequently, as proposed, the MPOs would have the

<sup>76</sup> 23 U.S.C. 134(i).

<sup>77</sup> 23 U.S.C. 119(e).

<sup>78</sup> 23 U.S.C. 134(h)(2)(C) requires that an MPO establish targets 180 days after the relevant State DOT establishes its target, but does not require that the MPO establish the same number of targets as the State. For certain measures, even where a State DOT is establishing a 2-year and a 4-year target at the start of a performance period, FHWA is proposing that MPOs would only need to establish a 4-year target.



flexibility to establish their targets using one of the two options. The FHWA proposes in section 490.105(f)(3) that, for most of the measures, MPOs would establish targets, specific to the metropolitan planning area, by either: (1) Agreeing to plan and program projects so that they contribute toward the accomplishment of the relevant State DOT target, or (2) committing to a quantifiable target for their metropolitan planning area. This proposal would give MPOs two options to establish targets. The MPOs could establish their own quantifiable targets. Alternatively, recognizing that the resource level and capability of some MPOs to reliably predict performance outcomes varies across the country, FHWA is proposing an approach that would allow MPOs that do not want to establish their own quantifiable target to establish targets by supporting the State DOT targets for performance. The MPOs would do this through their investment decisionmaking process. Regardless of which option MPOs use to establish targets, FHWA recognizes that the MPOs may need to work with relevant State DOTs to coordinate, plan, and program projects for their planning area.

However, these MPO target establishment options would not be available for MPOs subject to the peak hour travel time or the traffic congestion measures because FHWA has proposed that MPOs and the State DOTs subject to these measures establish identical targets. Also those MPO target establishment options would not be available for certain MPOs<sup>79</sup> for the on-road mobile source emissions measure as those MPOs are required to commit to their targets for the entire subject area under 23 U.S.C. 149(l).

As discussed previously, FHWA is proposing that MPOs establish targets for the peak hour travel time and traffic congestion measures for applicable urbanized areas. The FHWA proposes that MPOs, with mainline highways on the Interstate System that cross any part of an urbanized area with a population more than 1 million within its metropolitan planning area boundary, would establish a target for peak-hour travel time for the Interstate System for that urbanized area. Similarly, FHWA proposes that MPOs, with mainline highways on the non-Interstate NHS that cross any part of an urbanized area with a population more than 1 million within its metropolitan planning area boundary, would establish a target for

peak-hour travel time for the non-Interstate NHS for that urbanized area.

The FHWA proposes an MPO would establish targets for the traffic congestion measure when mainline highways on the NHS within that MPO's metropolitan planning area boundary cross any part of an urbanized area with a population more than 1 million, and that portion of the metropolitan planning area boundary intersecting the urbanized area also includes a nonattainment or maintenance area for any one of the criteria pollutants, as specified in section 490.703. If an MPO's metropolitan planning area boundary overlaps with an urbanized area where a traffic congestion target is required but that MPO is not required to establish the traffic congestion target, then the MPO should coordinate with relevant State DOT(s) and MPO(s) in the target selection process for the traffic congestion measure. The FHWA is proposing in section 490.105(f)(4) that MPOs would be subject to the same requirements as State DOTs for the establishment of a single peak hour travel time target and a single traffic congestion target. This would require MPOs to establish both 2-year and 4-year targets that would be identical to the targets reported by other State DOTs and MPOs that share in roadway network for the applicable urbanized area. The proposed language is similar to the proposal for State DOT targets for these measures in section 490.105(e)(8). It is possible that an MPO could be required to establish more than 1 peak hour travel time or traffic congestion target if the boundary of the respective metropolitan planning area includes applicable roadways that are in multiple, separate applicable urbanized areas. Based on the data available<sup>80</sup> at this time, FHWA has prepared a list<sup>81</sup> of the State DOTs and MPOs which might be affected by proposed peak hour travel time and traffic congestion measures and included this list in the docket.

In section 490.105(f)(4)(iv), FHWA proposes the same requirements be

<sup>80</sup> Metropolitan Planning Area Data: FHWA HEPGIS (Accessed on 5/1/2015): <http://hepgis.fhwa.dot.gov/hepgismaps11/ViewMap.aspx?map=MPO+Boundaries&MPO+Boundary#>. The nonattainment/maintenance status of the MPOs areas was verified on 5/1/2015 based on EPA's Green Book (updated on April 14, 2015): [http://www.epa.gov/oaqps001/greenbk/gis\\_download.html](http://www.epa.gov/oaqps001/greenbk/gis_download.html). Population Data for Urbanized Areas (Accessed on 8/7/2013): <https://www.census.gov/geo/reference/ua/urban-rural-2010.html>.

<sup>81</sup> Documents "Peak Hour Travel Time Measure States and MPOs.pdf" and "CMAQ Measure States and MPOs.pdf" in the docket.

applied to MPOs for the traffic congestion target as required for State DOTs in sections 490.105(e)(8)(vi)(A) and (e)(8)(vi)(B), which would require only 4-year targets to be established for the first performance period. This will provide additional time needed for MPOs to become more proficient in the management of traffic congestion and for travel time data coverage to be more complete within the NPMRDS. Please see discussion for section 490.105(e)(8)(vi) for more details.

The FHWA proposes in section 490.105(f)(5) MPO target establishment requirements for the proposed on-road mobile source emission measure, identified in section 490.807. The proposed language is similar to the proposal for State DOT targets for these measures in 490.105(e)(9). In section 490.105(f)(5)(i), FHWA proposes that MPOs would establish targets for each applicable criteria pollutant (and precursor (PM<sub>2.5</sub>, PM<sub>10</sub>, CO, VOC and NO<sub>x</sub>) for which the area is designated as nonattainment or maintenance under the NAAQS.

As discussed in section 490.105(e)(9), the MPOs would adhere to the Federal fiscal year based performance periods for the on-road mobile source emissions targets. In paragraph (ii) of this section, FHWA proposes that the MPOs would establish targets as discussed in section 490.105(e)(9)(iii).

In section 490.105(f)(5)(iii), FHWA proposes that if any part of the nonattainment or maintenance area within a metropolitan planning area for any one of the applicable criteria pollutants is located within the boundary of an urbanized area with a population more than 1 million in population, then that MPO would establish both 2-year and 4-year targets for its metropolitan planning area.

In section 490.105(f)(5)(iv), FHWA proposes that a nonattainment or maintenance area within a metropolitan planning area for any one of the applicable criteria pollutants is not located within the boundary of an urbanized area with a population more than 1 million in population, then that MPO would not be required to establish a 2-year target and would only establish both 4-year targets for its metropolitan planning area as required in section 490.105(f)(3).

In section 490.105(f)(5)(v) and (f)(5)(vi), FHWA proposes the same requirements be applied to MPOs for the on-road mobile source emission target as required for State DOTs in sections 490.105(e)(9)(v) and (e)(9)(vi). In section 490.105(f)(5)(vii), FHWA proposes language for the MPOs that is similar to

<sup>79</sup> MPOs in an urbanized area with a population greater than 1 million that contain areas designated as nonattainment or maintenance for any of the criteria pollutants applicable to the CMAQ program.

the State DOT provision in section 490.105(e)(9)(vii).

As discussed in section 490.105(e)(9), both traffic congestion and on-road mobile source emission measures are proposed to carry out the CMAQ Program, but there are some differences in how the targets for the measures are to be implemented. Please refer to the discussion for section 490.105(e)(9) for a summary of differences.

As stated in the section 490.105(e)(6) discussion, State DOTs may adjust their established 4-year targets when they submit their State Biennial Performance Report just after the midpoint of the performance period (*i.e.*, Mid Performance Period Progress Report, described in section 490.107(b)(2)). The MPOs are required to establish targets 180 days after the date on which the relevant State DOT(s) establishes their targets, as specified in 23 U.S.C. 134(h)(2)(C). If a State DOT adjusts a target, as allowed under the proposed sections 490.105(e)(6) and 490.107(b)(2), any relevant MPOs would be required to also re-establish targets for the same measures within 180 days. However, FHWA is proposing that the MPO only be required to re-establish the target if the MPO had originally elected to establish a target supporting the State DOT target for that measure in section 490.105(f)(3). In that case, the adjusted State target could directly impact an MPO's investment decisionmaking. Specifically, FHWA proposes in section 490.105(f)(7) that if a State DOT adjusts its 4-year target in the State DOT's Mid Performance Period Progress Report and the MPO established the relevant target by supporting the State DOT target as allowed under section 490.105(f)(3), then the MPO would be required, within 180 days, to report to the State DOT if they either: (1) Agree to plan and program projects so that they contribute toward the accomplishment of State DOT adjusted target, or (2) commit to its own quantifiable 4-year target for the metropolitan planning area. Since a single, unified peak hour travel time target and a single, unified traffic congestion target would be established for each applicable urbanized area as discussed in section 490.105(e)(8), FHWA expects that if either of these 4-year targets need adjustment, all involved MPO(s) and State DOT(s) would collectively adjust target(s) in a manner that is documented and mutually agreed upon by all State DOTs and MPOs.

As with State DOTs, FHWA recognizes that MPOs would need to consider many factors in establishing targets, such as uncertainties in funding, changing priorities, and external factors

outside the control of the MPO. Thus, FHWA proposes in section 490.105(f)(8) that MPOs may adjust their established 4-year target in a manner that is consistent with the process MPOs and State DOTs agreed upon. The FHWA recognizes that for many MPOs the establishment of targets, especially for the first performance period, would be new and challenging and that there may be a need to revisit targets during the 4-year performance period. The FHWA requires State DOTs and MPOs to coordinate with each other throughout the performance period with respect to any target adjustments so their targets are consistent to the maximum extent practicable.

In section 490.105(f), FHWA proposes that the method by which MPOs would report their established baseline condition/performance, targets, and progress toward achieving targets would be as specified in section 490.107(c). The FHWA further proposes in 490.105(f)(8) that the State would be able to provide MPO targets to FHWA on request after targets are established or adjusted by MPOs within the State. The FHWA believes that, through the coordination between a State DOT and relevant MPOs, the reporting on MPO progress can be shared between these two entities. However, FHWA expects to be able to request from a State DOT the MPO targets and reports on progress, as needed, to better understand performance expectations and outcomes in urbanized areas across the country. The State DOT and MPO would document the target establishment reporting process. The FHWA encourages State DOTs to work with multiple MPOs to mutually agree on a process for reporting that would provide a sufficient level of consistency to understand performance in urbanized areas collectively across the State.

#### Discussion of Section 490.107 Reporting on Performance Targets

Proposed reporting requirements for measures identified in section 490.207(a) are discussed in section 490.213 of the first performance management NPRM; and performance target reporting requirements specific to pavement condition measures in sections 490.307(a)(1) through (c)(4) and bridge condition measures in sections 490.407(c)(1) and (c)(2) are included in the second performance management NPRM. The discussions specific to those measures will not be repeated in this NPRM. Please see the docket for proposed Subpart A in its entirety for additional information.

Pursuant to 23 U.S.C. 150(e), State DOTs are required to submit reports on

performance targets and progress in achieving established targets to FHWA not later than October 1, 2016, and every 2 years thereafter. The FHWA evaluated whether there were any existing reports that could be used to meet these 23 U.S.C. 150(e) reporting requirements. For the non-HSIP related measures, FHWA determined that none of the existing reporting requirements met the statutorily required timing. In addition, none of the existing reports currently provide the consistency needed to implement performance management nationally. For these reasons, FHWA proposes a new biennial report to meet the statutory requirements.

The FHWA proposes in section 490.107 for State DOT performance reporting to be used:

- In the determination of significant progress toward achieving NHPP and NHFP targets;
- to provide some of the information needed for FHWA to report to Congress on the performance-based planning process evaluation of each State DOT as required by 23 U.S.C. 135(h);
- to understand performance needs, expectations, and progress at a State, regional, and national level; and
- to provide for transparency by communicating the content of the report to the public on an externally facing Web site in a downloadable format.

In section 490.107, FHWA proposes the minimum requirements that State DOTs and MPOs would follow to report targets for all measures identified in section 490.105(c), which include the proposed measures in both this performance management NPRM and the second performance management NPRM. In section 490.107(a), FHWA proposes that all performance targets described in section 490.105 would be subject to biennial performance reporting in this section. However, reporting on performance targets for carrying out the HSIP would be in accordance with section 490.213. In the first performance measure rulemaking, published as a final rule on March 15, 2016, FHWA requires a 1 calendar year period as the basis for measurement, target establishment, and reporting. As discussed in section 490.101 of that Rule, a 1-year period is required to align the safety measures with the requirements for the common measures reported as a requirement of 23 U.S.C. 402. The FHWA also proposes that State DOTs use an electronic template to deliver the report proposed in section 490.107(a)(3). The FHWA intends to provide additional guidance regarding the template which will include fields to capture all of the information that

would be required to be reported under this rulemaking.

The FHWA anticipates the final rule for the pavement and bridge condition performance measures (proposed in the second performance management NPRM) to be effective no later than October 1, 2016, and anticipates that the final rule for this proposal to be effective no later than October 1, 2017. However, 23 U.S.C. 150(e) requires State DOTs to submit reports on performance targets and progress in achieving established targets to FHWA not later than October 1, 2016. To meet the statutory deadlines for the first State DOT performance report due in 2016, FHWA proposes the minimum reporting requirements that would be followed by State DOTs in section 490.107(a)(4). The FHWA proposes that State DOTs would submit an Initial State Performance Report to FHWA by October 1, 2016. In that report, the State DOTs shall include: (1) The condition/performance of the NHS in the State derived only from the available data in HPMS and NBI; (2) the effectiveness of the investment strategy document in the State asset management plan for the NHS; (3) progress toward targets the State DOT would be required to establish, which may only be a description of how State DOTs would coordinate with relevant MPOs and other agencies in target selection for the targets to be reported in the first State Biennial Performance Report in 2018; and (4) the ways in which the State is addressing congestion at freight bottlenecks.

Pursuant to 23 U.S.C. 150(d)(1), FHWA proposes in section 490.107(a)(5) that State DOTs would establish targets within 1 year of the effective date of applicable rule and the State DOTs would report the initial targets to FHWA. In this section, FHWA proposes that State DOTs submit their 2-year and 4-year targets for the first performance period to FHWA either within 30 days

of target establishment by amending the Initial State Performance Report or on the due date of the first Baseline Performance Report, whichever comes first. The related NPRMs are being published on individual schedules. This creates the possibility that State DOTs will be required to establish targets for some performance measures, such as those published in the second performance management NPRM, well before the first Baseline Performance Report is due in October 2018. This proposal ensures timely reporting of targets, and allows FHWA to begin to develop a national story around targets sooner.

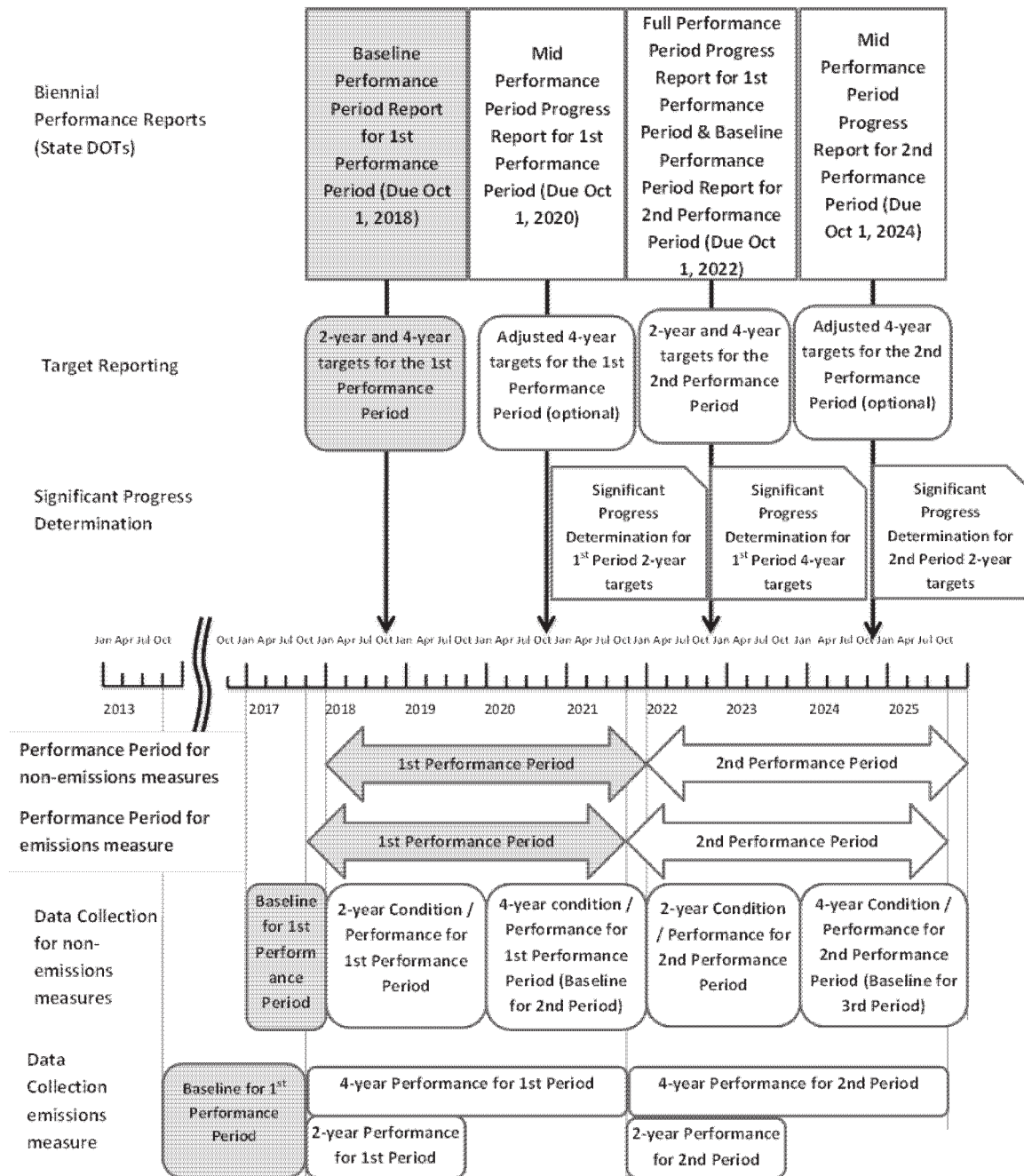
For consistent State DOT and FHWA reporting, FHWA proposes a 4-year performance period in section 490.105(e)(4). The FHWA recognizes the need for uniform data collection timing in order to ensure consistency in reporting and repeatable target establishment and progress evaluation processes. Thus, in subsequent sections, FHWA proposes the timing of data collection based on the specified performance periods, described in section 490.105(e)(4). The FHWA proposes that data collection requirements for the established measures support the reporting requirements in this section and be in accordance with the respective Data Requirements section for each measure (see section 490.103). To ensure consistency in reporting, FHWA proposes that the reported baseline condition/performance be derived from the latest data collected through the beginning date of a performance period, the reported actual 2-year condition/performance be derived from the latest data collected through the midpoint of a performance period, and the reported actual 4-year condition/performance be derived from the latest data collected through the end date of a performance period. This is illustrated in Figures 1

and 2 in the discussion for section 490.105(e)(4).

The FHWA proposes in section 490.107(b) that State DOTs submit to FHWA three types of Biennial Performance Reports: Baseline Performance Period Report, Mid Performance Period Progress Report and Full Performance Period Progress Report. The FHWA proposes to make a distinction between the three reports to emphasize the differences in content while aligning the reporting process to the proposed target establishment, progress evaluation, and other performance reporting requirements. Figures 3–5 illustrate the proposed reporting timelines for the three types of Biennial Performance Reports. The proposed requirements identify three distinct biennial performance reports (baseline, mid, and full) and State DOTs will be expected to provide information for at least one of these reports every 2 years. Because these reports would be required for consecutive 4-year performance periods, the information provided in the Full Performance Period Report would be provided at the same time and may include some of the same information as the Baseline Performance Period Report for the next performance period. As discussed previously, FHWA is proposing to provide for an electronic template that State DOTs would use to capture the information required in each of the three reports discussed in section 490.107(b). It is envisioned that this electronic template would provide the State DOT all of the relevant fields for the information that would be due at the corresponding 2-year point. This approach would allow State DOTs to provide all of the required baseline and progress reporting information at one time. The proposed regulations identify three distinct reports to clarify the purpose and timing of information that would be required to be reported every 2 years.



## Discussion of Baseline Performance Period Reports



**Figure 3 – Biennial Performance Reports – The Baseline Performance Period Report**

The FHWA proposes the requirement for the Baseline Performance Period Report in section 490.107(b)(1), where the State DOTs would be required to submit a Baseline Performance Period Report no later than October 1st of the first year of a performance period. The FHWA is proposing that the first performance period would begin on January 1, 2018, for the measures

identified in section 490.105(c)(1) through (c)(7) and would begin on October 1, 2017, for emission measure identified in section 490.105(c)(8). Although the performance periods may be different, the reporting for all the measures in 490.105(c) would follow the same schedule. State DOTs would submit their Initial State Performance Report no later than October 1, 2018.

Subsequent Baseline Performance Period Reports would be due no later than October 1st every 4 years thereafter.

The required contents for the Baseline Performance Period Report are discussed in section 490.107(b)(1)(ii). The FHWA is proposing that the Baseline Performance Period Report would be the official source of the non-

safety targets established by the State DOT. To document the established targets, FHWA proposes in section 490.107(b)(1)(ii)(A) that State DOTs would report both their established 2-year and 4-year targets for each measure listed in section 490.105(c) for the current performance period. Additionally, if a State DOT elects to establish additional targets as described in sections 490.105(e)(3) and 490.105(e)(9)(iv), the State DOT would be required to include these targets (both 2-year target and 4-year target) in the report.

Although FHWA would not approve the State DOT submitted targets, a discussion of the basis for each established target would be included in the Baseline Performance Period Report. The FHWA believes that this discussion is needed to explain the State DOT's basis for the selection of a target. The FHWA intends to publish the State DOT established targets on a publicly available Web site along with the State DOT's discussion of the basis for each target selection. Although other MAP-21 required plans and reports may discuss and use targets, FHWA is proposing that only the targets reported in the Baseline Performance Period Report and the HSIP report would be used by FHWA in carrying out the requirements of 23 CFR 490, as they are the targets established by the State DOT to meet the requirements of 23 U.S.C. 150(d).

The FHWA proposes in section 490.107(b)(1)(ii)(B) that the State DOTs report baseline condition/performance associated with each target reported to represent the latest condition/performance data collected through the beginning date of a performance period. Because the first performance period for the measures in section 490.105(c)(1) through (c)(7) is proposed to begin on January 1, 2018, the baseline condition/performance for this performance period would be the most recent condition/performance that represents actual condition/performance through December 31, 2017. As the first performance period for the on-road mobile source emissions measure in section 490.105(c)(8) is proposed to begin on October 1, 2017, State DOTs would establish baseline performance of a 4-year cumulative emissions reduction resulting from CMAQ projects from fiscal year 2014 through fiscal year 2017 (ending September 30, 2017) in the CMAQ Public Access System, as described in section 490.809. The CMAQ Public Access System contains 20 years of past data. Since all past data in the CMAQ Public Access System may not have the necessary values for the

proposed measure, FHWA believes that State DOTs should revisit the data for CMAQ projects from fiscal year 2014 through fiscal year 2017 to improve baseline performance establishment which would ultimately help the State DOTs in their target establishment. Should a State DOT elect to establish additional targets, as described in sections 490.105(e)(3) and 490.105(e)(9)(iv), the State DOT would report baseline condition/performance that represent the applicable areas in addition to the statewide baseline condition/performance. As an example, for the Percent of the Interstate System providing for Reliable Travel Times measure (in section 490.507(a)(1)), would be a percentage of directional mainline highways on the Interstate System providing for Reliable Travel Times (sections 490.503(a)(1) and 490.513(b)) expressed in one tenth of a percent. Thus, FHWA proposes that a baseline condition/performance for this measure would be a percentage of directional mainline highways on the Interstate System providing for Reliable Travel Times expressed in one tenth of a percent. As a hypothetical example, a baseline condition/performance would be 37.7 percent for the proposed measure Percent of the Interstate System providing for Reliable Travel Times.

The FHWA proposes in section 490.107(b)(1)(ii)(C) that State DOTs would be required to also include a discussion in the Baseline Performance Period Report, of how the established 2-year and 4-year targets support longer term performance expectations in other performance-related plans, such as the State asset management plan and the long-range statewide transportation plan.

The FHWA proposes in section 490.107(b)(1)(ii)(D) that State DOTs would be required to report the geographic boundaries and Decennial Census population data used to determine target scope and establish any additional targets for urbanized and non-urbanized areas. Similarly, in section 490.107(b)(1)(ii)(E), FHWA proposes that State DOTs would be required to report the NHS network limits used for target establishment. The State DOT would report both the urbanized area boundaries and NHS limits used for target establishment by identifying the corresponding data inventory year of the HPMS that includes this information. Additionally, State DOTs would be required to report the latest Decennial population data for all urbanized areas in accordance with HPMS Field Manual. The FHWA would use this information in determining measure applicability and making its

progress determinations in future years. It is the State's responsibility to ensure that the data entered into HPMS reflects the information that is used for target establishment.

The FHWA proposes in section 490.107(b)(1)(ii)(F) that, in each Baseline Performance Period Report, State DOTs would include discussions on the ways in which State DOTs are addressing congestion at freight bottlenecks, including those identified in the National Freight Strategic Plan. This content is required as part of the report under 23 U.S.C. 150(e)(4). To meet this requirement for State DOTs to address congestion at freight bottlenecks within the State, FHWA proposes that State DOTs would describe their activities to improve freight bottlenecks. For the purpose of this report only, freight bottlenecks would be defined as the segments of the Interstate System not meeting thresholds for freight reliability and congestion (section 490.613) and any other locations the State wishes to identify as bottlenecks based on its own freight plans or related documents if applicable. Further, the State DOT should reference its activities in other freight planning and programs that focus on improving freight bottlenecks, including: Comprehensive freight improvement efforts of Statewide Freight Planning or MPO freight plans; the Statewide Transportation Improvement Program (STIP) and TIP; regional or corridor level efforts; other related planning efforts; and operational and capital activities targeted to improve freight movement on the Interstate. The FHWA understands the multifaceted and multimodal nature of a freight bottleneck and that many State DOTs will likely define bottlenecks beyond the definition for this Part. The FHWA believes that due to the diversity in characteristics of bottlenecks and a lack of a universal definition or approach to measurement, this reporting on freight bottlenecks should be focused at a minimum on the performance measures, as proposed in section 490.607 and how those measures and the State DOT's associated targets might be impacted by other freight efforts currently underway, such as planning or programming. The FHWA encourages State DOTs to consider multimodal freight performance in transportation planning and programming efforts taking place beyond this rule. Upon development of the National Strategic Freight Plan, a State DOT shall specifically include its activities for addressing freight bottlenecks as part of that Plan in this report. The FHWA is seeking comment on this approach.

The FHWA proposes in section 490.107(b)(1)(ii)(G) that State DOTs, where applicable, would be required to describe the boundaries of EPA's designation of nonattainment or maintenance areas under the NAAQS in 40 CFR part 81 at the time when the State DOT Baseline Performance Period

Report is due to FHWA. Please refer to the discussion in section 490.103(c) for more information.

As discussed in section 490.107(c)(3), MPOs serving a TMA with a population over 1 million representing nonattainment and maintenance areas for O<sub>3</sub>, CO or PM NAAQS are required

to submit CMAQ Performance Plan, required under 23 U.S.C. 149(l), as a part in the State Biennial Performance Report. In section 490.107(b)(1)(ii)(H), the FHWA proposes that State DOTs would report relevant MPOs' CMAQ Performance Plan, where applicable.

## Discussion of Mid Performance Period Report

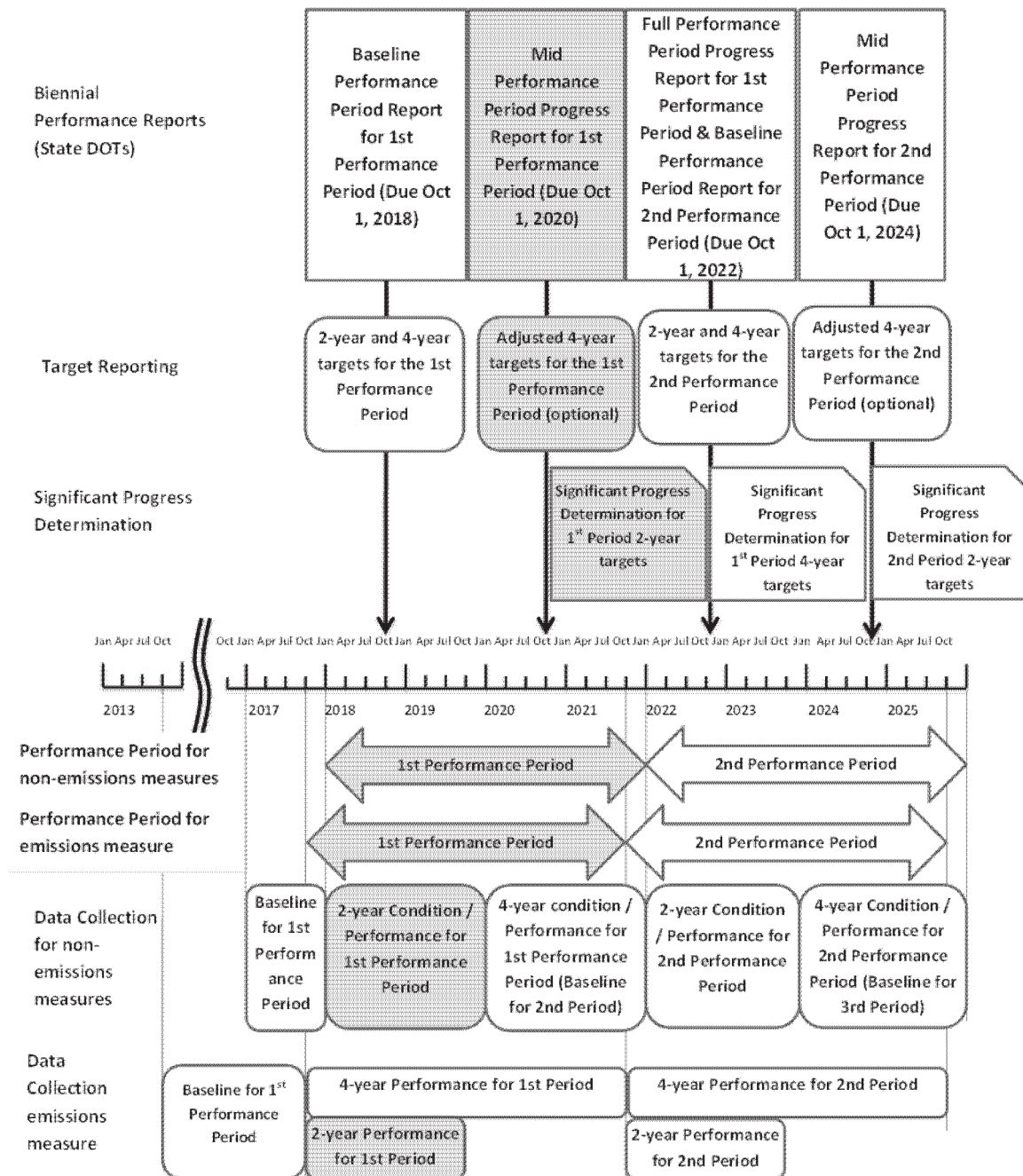


Figure 4 – Biennial Performance Reports – The Mid Performance Period Report



The FHWA proposes the requirement for the Mid Performance Period Progress Report in section 490.107(b)(2). In section 490.107(b)(2)(i), FHWA proposes that State DOTs would be required to submit a Mid Performance Period Progress Report no later than October 1st of the third year of a performance period. The FHWA is proposing that the first performance period would begin on January 1, 2018, for the measures identified in section 490.105(c)(1) through (c)(7) and would begin on October 1, 2017, for the emission measure identified in section 490.105(c)(8). Although the performance periods may be different, the reporting for all the measures in section 490.105(c) would follow the same schedule. State DOTs would submit their first Mid Performance Period Progress Report no later than October 1, 2020, and subsequent Mid Performance Period Progress Reports would be due no later than October 1st every 4 years thereafter.

In section 490.107(b)(2)(ii), FHWA proposes the required contents for the Mid Performance Period Progress Report. In section 490.107(b)(2)(ii)(A), FHWA proposes that State DOTs would be required to report 2-year condition/performance in each Mid Performance Period Progress Report. As exhibited in Figure 4, FHWA proposes that the 2-year condition/performance would be reported to represent the actual condition/performance derived from the latest measured condition/performance through the midpoint of a performance period. Considering the first performance period is proposed to begin on January 1, 2018, for the measures identified in section 490.105(c)(1) through (c)(7), 2-year condition/performance for this performance period would be the most recent conditions/performance that represents actual conditions/performance through December 31, 2019, (illustrated in Figure 4). As defined in section 490.101, a target is a numeric value that represents a quantifiable level of condition/performance in an expression defined by a measure. The FHWA proposes that a target would be a single numeric value representing the intended or anticipated condition/performance level at a specific point in time. For example, the proposed measure, Percent of the Interstate System providing for Reliable Travel Times measure (in section 490.507(a)(1)), would be a percentage of directional mainline highways on the Interstate System providing for Reliable Travel Times (sections 490.503(a)(1) and 490.513(b)) expressed in one tenth of a

percent. Thus, FHWA proposes that a target for this measure would be a percentage of directional mainline highways on the Interstate System providing for Reliable Travel Times expressed in one tenth of a percent. As a hypothetical example, a 2-year target for that measure would be 39.5 percent. The 2-year condition/performance would be 39.2 percent. For the on-road mobile emissions measure identified in section 490.105(c)(8), 2-year condition/performance for this performance period would be the estimated cumulative emissions reduction resulting from CMAQ projects from fiscal year 2018 through fiscal year 2019 in the CMAQ Public Access System, as described in section 490.809.

The FHWA proposes in section 490.107(b)(2)(ii)(B) that State DOTs would also include a discussion of progress made toward the achievement of 2-year targets established for the current performance period. In this discussion, State DOTs would present a comparison of 2-year condition/performance with the 2-year targets that were established for the performance period. For example, in the first Mid Performance Period Progress Report in 2020, a State would compare the actual condition/performance through 2019 with the 2-year targets established for the first performance period and discuss why targets were or were not achieved. This discussion could describe accomplishments achieved, planned activities, circumstances that led to actual conditions/performance, or any other information that State DOT feel would adequately explain progress. Although this explanation would not be used to determine significant progress, as described in section 490.109, this information would be made available to the public to provide an opportunity for the State DOT to discuss actual outcomes achieved. As an example, for the Percent of the Interstate System providing for Reliable Travel Times measure (in section 490.507(a)(1)), a hypothetical 2-year target for this measure is 39.5 percent (in section 490.105(e)). If 2-year condition/performance for this measure is 39.2 percent as discussed above, the State DOT would discuss why this target was not achieved in its Mid Performance Period Progress Report.

The FHWA proposes in sections 490.107(b)(2)(ii)(C) and (D) that, in each Mid Performance Period Progress Report, State DOTs would include discussions on the effectiveness of the investment strategy documented in the State asset management plan for the NHS and the ways in which State DOTs are addressing congestion at freight

bottlenecks, including those identified in the National Freight Strategic Plan, as described in section 490.107(b)(1)(ii)(F). This content is required as part of the report under 23 U.S.C. 150(e)(2) and (4). The FHWA recognizes that the Mid Performance Period Progress Report for the first performance period may be impacted by the timing of the implementation of the new NHS asset management plan requirement and the development of a final National Freight Strategic Plan. The FHWA intends to issue further guidance if the timing of these two plans would impact a State DOT's ability to comply with the requirements proposed in sections 490.107(b)(2)(ii)(C) and (D).

As discussed in section 490.105(e)(6), FHWA recognizes the challenges that State DOTs may face in target establishment and proposes to allow State DOTs to adjust their 4-year targets. The FHWA is proposing in section 490.107(b)(2)(ii)(E) that State DOTs would report any adjustments to their 4-year targets in the Mid Performance Period Progress Report. The FHWA proposes that this target adjustment allowance would be limited to this specific report and not allowed prior to, or following, the submittal of the Mid Performance Period Progress Report. For example, if a State DOT elects to adjust a 4-year target established in its first Baseline Performance Period Report in 2018, the State DOT would only be able to adjust the 4-year target in its Mid Performance Period Progress Report in 2020. In addition to reporting the adjusted 4-year target, the State DOT would be required to include a discussion on the basis for the adjusted 4-year target(s) for the performance period and a discussion on how the adjusted targets support expectations documented in longer range plans, such as the State asset management plan and the long-range statewide transportation plan. The FHWA intends to publish the State DOT established targets on a publicly available Web site with the initial target basis discussion. Any targets adjusted at the mid-point will also be reflected on the site.

The FAST Act introduced 23 U.S.C. 167(j), which requires FHWA to determine if a State has met or made significant progress toward meeting the performance targets related to freight movement. This was not part of MAP-21. To meet the requirements of the FAST Act, FHWA has incorporated language throughout this NPRM requiring the targets established for the measures in section 490.105(c)(6) to be included in the significant progress process. The FHWA has called these the NHFP targets. Section

490.107(b)(2)(ii)(F) is the first regulatory reference to the NHFP.

In section 490.107(b)(2)(ii)(F), FHWA proposes that the State DOTs would discuss the progress they have made toward the achievement of the 2-year targets reported in the current Baseline Performance Period Report that would have been established for the NHPP measures specified in sections 490.105(c)(1) through (c)(5) and the NHFP measures in section 490.105(c)(6). Additionally, State DOTs would provide information to discuss how the actual 2-year condition/performance levels compare to targets. Although this discussion would not be used to determine significant progress for the applicable measures, this information would be made available to the public to provide an opportunity for the State DOT to discuss actual outcomes related to the NHPP and NHFP. For example, the State DOT may use this discussion to explain how it effectively and efficiently delivered a program designed to achieve 2-year targets, how this may have resulted in actual condition/performance improvements for the NHPP and NHFP, and how the State DOT would deliver a program to make

significant progress for 4-year targets for the NHPP and NHFP.

In section 490.107(b)(2)(ii)(G), FHWA is proposing that a State DOT would report any factors that it could not have foreseen and were outside of its control that impacted its ability to make significant progress for the 2-year targets for the NHPP or NHFP. The FHWA would use this discussion when considering extenuating circumstances discussed in section 490.109(e)(4).

In section 490.107(b)(2)(ii)(H), FHWA proposes that if FHWA determines that a State DOT has not made significant progress toward the achievement of any NHPP or NHFP targets in a biennial FHWA determination, then the State DOT would include a description of the actions it will undertake to achieve those targets as required, respectively, under 23 U.S.C. 119(e)(7) or 167(j).

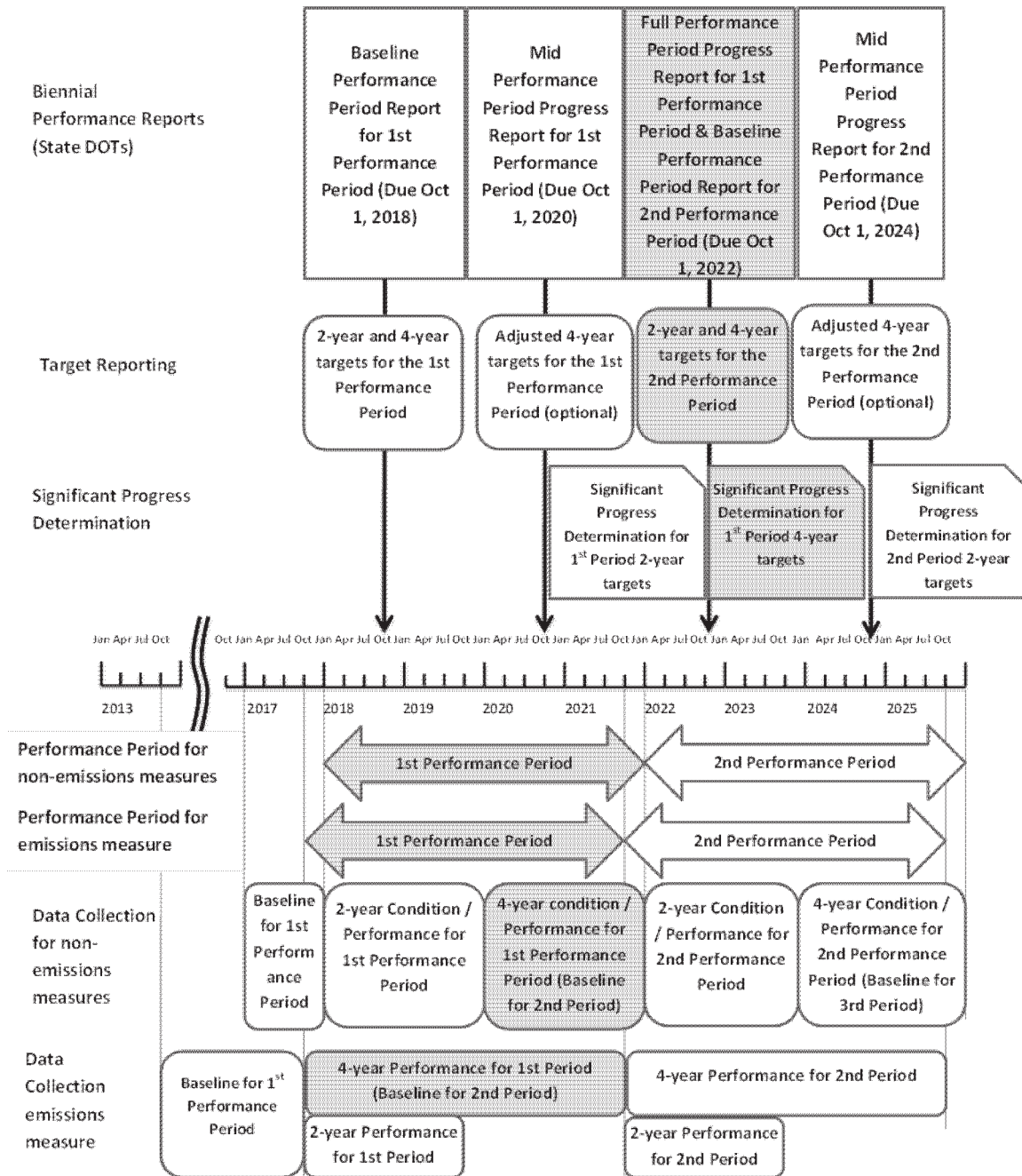
For example, for the NHPP or the NHFP, if FHWA determines that a State DOT has not made significant progress (as provided in section 490.109(e)(2)) for either the 2-year or 4-year significant progress determination, then the State DOT would include a description of the actions it would undertake to achieve its conditions/performance with respect to

all related measures (section 490.109(f)) in its next Biennial Progress Report. If FHWA determines that the State DOT has achieved the target or made significant progress, then the State DOT does not need to include such description in the next Biennial Progress Report.

For the NHPP targets, the FAST Act amended the language in MAP-21, and changed the determination period from being based on looking back over “two consecutive determinations” (a 4-year period) to a single biennial FHWA determination which looks back over a 2-year period. This is a change from the language presented in the second NPRM, but it is required to be consistent with the amended statute.

As discussed in section 490.107(c)(3), MPOs serving a TMA with a population over 1 million representing nonattainment and maintenance areas for O<sub>3</sub>, CO, or PM NAAQS are required to submit CMAQ Performance Plan, required under 23 U.S.C. 149(l), as a part in the State Biennial Performance Report. In section 490.107(b)(2)(ii)(I), FHWA proposes that State DOTs would report relevant MPOs’ CMAQ Performance Plan, where applicable.

## Discussion of Full Performance Period Reports



**Figure 5 –Biennial Performance Reports – The Full Performance Period Report**

The FHWA proposes the requirement for the Full Performance Period Progress Report in section 490.107(b)(3). In section 490.107(b)(3)(i), FHWA proposes that State DOTs be required to submit a Full Performance Period Progress Report no later than October 1st of the first year following the completion of a performance period. The FHWA is proposing that the first performance period would begin on

January 1, 2018, for the measures identified in section 490.105(c)(1) through (c)(7) and would begin on October 1, 2017, for emission measure identified in section 490.105(c)(8). Although the performance periods may be different, the reporting for all the measures in section 490.105(c) would follow the same schedule. State DOTs would submit their first Full Performance Period Progress Report no

later than October 1, 2022, and subsequent Full Performance Period Progress Reports would be due no later than October 1st every 4 years thereafter.

In section 490.107(b)(3)(ii), FHWA proposes the required contents for Full Performance Period Progress Report.

In section 490.107(b)(3)(ii)(A), FHWA proposes that State DOTs would be required to report 4-year condition/



performance in each Full Performance Period Progress Report. As exhibited in Figure 5, FHWA proposes that the 4-year condition/performance be reported to represent the actual condition/performance derived from the latest measured condition/performance through the end of a performance period. Considering the first performance period is proposed to begin on January 1, 2018, for the measure identified in section 490.105(c)(1) through (c)(7) and on October 1, 2017, for the measure identified in section 490.105(c)(8), the 4-year condition/performance for this performance period would be the most recent conditions/performance that represents actual conditions/performance through December 31, 2021 (illustrated in Figure 5). For the on-road mobile emissions measure identified in section 490.105(c)(8), 4-year condition/performance for this performance period would be the 4-year cumulative emissions reduction resulting from CMAQ projects from fiscal year 2018 through fiscal year 2021 in the CMAQ Public Access System, as described in section 490.809. As indicated in Figure 5, the reported 4-year condition/performance in a Full Performance Period Progress Report would be the baseline condition/performance for next performance period for all measures.

As an example, for the Percent of the Interstate System providing for Reliable Travel Times measure (in section 490.507(a)(1)), an hypothetical 4-year target for this measure is 38.5 percent (in section 490.105(e)). If 4-year condition/performance for this measure is 37.7 percent as discussed above, the State DOT would discuss why this target was not achieved in their Full Performance Period Progress Report.

The FHWA proposes in section 490.107(b)(3)(ii)(B) that the State DOTs would also include a discussion of progress made toward the achievement of 4-year targets established for the relevant performance period. In this discussion, State DOTs would present a comparison of 4-year condition/performance with the 4-year targets that were established for the performance period. For example, in the first Full Performance Period Progress Report in 2022, a State DOT would compare the actual condition/performance through the end of the performance period with the 4-year targets established for the first performance period and discuss why targets were or were not achieved. This discussion could describe accomplishments achieved, planned activities, circumstances that led to actual conditions/performance or any other information that State DOT would

feel would adequately explain progress. Although this explanation would not be used in the determination of significant progress, this information would be made available to the public to provide an opportunity for the State DOT to discuss actual outcomes achieved.

As discussed in sections 490.107(b)(2)(ii)(C) and (D) for the Mid Performance Period Progress Report, FHWA also proposes in sections 490.107(b)(3)(ii)(C) and (D) that in each Full Performance Period Progress Report, State DOTs would include discussions on the effectiveness of the investment strategy documented in their State asset management plans for the NHS and the ways in which State DOTs are addressing congestion at freight bottlenecks, including those identified in the National Freight Strategic Plan, as described in section 490.107(b)(1)(ii)(F). Please refer to the discussion of sections 490.107(b)(1)(ii)(F), 490.107(b)(2)(ii)(C) and (ii)(D) for more information.

In section 490.107(b)(3)(ii)(E), FHWA proposes that the State DOTs would discuss the progress they have made toward the achievement of the 4-year targets reported in the current Baseline Performance Period Report, or adjusted in the current Mid Performance Period Progress Report, that would have been established for the NHPP measures specified in sections 490.105(c)(1) through (c)(5) and the NHFP measures specified in section 490.105(c)(6). Additionally, State DOTs would provide information to discuss how the actual 4-year condition/performance levels compare with the applicable NHPP or NHFP targets. Although this discussion would not be used in the determination of significant progress for the applicable measures, this information would be made available to the public to provide an opportunity for the State DOT to discuss actual outcomes related to the NHPP and NHFP. For example, the State DOT may use this discussion to explain how it effectively and efficiently delivered a program designed to achieve targets and how this may have resulted in actual condition/performance improvements for the NHPP and NHFP.

In section 490.107(b)(3)(ii)(F), FHWA is proposing that a State DOT would report any factors that it could not have foreseen and were outside of its control that impacted its ability to make significant progress for the NHPP or NHFP 4-year targets. This discussion would be used by FHWA to consider the application of the proposed consideration of extenuating circumstances discussed in section 490.109(e)(4).

In section 490.107(b)(3)(ii)(G), FHWA proposes that if FHWA determines that

a State DOT has not made significant progress toward the achievement of any NHPP or NHFP targets, then the State DOT would include a description of the actions it would undertake to achieve conditions/performances with respect to all related NHPP or NHFP measures within the measure group, as described in section 490.109(f).

For example, for the NHPP or NHFP, if FHWA determines that a State DOT has not made significant progress at either the 2-year or 4-year significant progress determination, then the State DOT would include a description of the actions it would undertake to achieve its targets with respect to all related measures in the next Biennial Progress Report. If FHWA determines that the State DOT has achieved or made significant progress, then the State DOT does not need to include this description in the next Biennial Progress Report.

As discussed in section 490.107(c)(3), MPOs serving a TMA with a population over one million representing nonattainment and maintenance areas for O<sub>3</sub>, CO, or PM NAAQS are required to submit CMAQ Performance Plan, required under 23 U.S.C. 149(l), as a part in the State Biennial Performance Report. In section 490.107(b)(3)(ii)(H), FHWA proposes that State DOTs would report relevant MPOs' CMAQ Performance Plan, where applicable.

The FHWA proposes, in section 490.107(c), that MPOs document the manner in which they report their established targets. The MPOs would report their established targets to the relevant State DOTs in a manner that is agreed upon by both parties and documented. The FHWA proposes in section 490.105(e)(5), that MPOs would report targets to the State DOT in a manner that would allow the State DOT to provide FHWA, upon request, all of the targets established by relevant MPOs. In section 490.107(c)(2), FHWA also proposes that MPOs would report baseline condition/performance, and progress toward the achievement of their targets, in the system performance report in the metropolitan transportation plan, in accordance with 23 CFR 450. In sections 490.105(e)(3) and 490.105(d)(3), FHWA discusses how an urbanized area boundary or NHS limit changes during a performance period may lead to changes in the measures reported for an area/network and could impact how an established target relates to actual measured performance. The FHWA anticipates that changes in the MPA boundary could also impact how an established target relates to actual measured performance. Thus, FHWA

seeks comment on whether the description of the MPA in place when establishing targets should be included in the system performance report and apply to the entire performance period.

As required in 23 U.S.C. 149(l), each MPO serving a TMA with a population over 1 million representing nonattainment and maintenance areas must develop a performance plan, updated biennially, to report baseline levels and the progress toward achievement of the targets for the CMAQ traffic congestion and on-road mobile source emissions measures. The FHWA proposes that the CMAQ performance plan is not required when the MPO does not serve a TMA with a population over 1 million; the MPO is attainment for O<sub>3</sub>, CO and PM NAAQS; or the MPO's nonattainment or maintenance area for O<sub>3</sub>, CO, or PM NAAQS is outside the urbanized area boundary of the TMA with a population over one million. Based on the data available,<sup>82</sup> FHWA has prepared a list<sup>83</sup> of the MPOs who might be subject to the CMAQ performance plan and included this list in the docket.

To encourage close coordination of the State DOT and MPOs in implementing the performance requirements and to streamline the reporting requirements, FHWA proposes in section 490.107(c)(3) that the MPOs meet the reporting requirements of the CMAQ performance plan in 23 U.S.C. 149(l) if the MPO's CMAQ performance plan is submitted as part of the State Biennial Performance Report as required under section 490.107(b). The CMAQ performance plan must be clearly documented in a separate section, as an attachment, of the State Biennial Performance Report. The FHWA is soliciting comments on other ways that will help further streamline the reporting requirements. Some options may include:

1. The MPOs could submit their CMAQ performance plans to FHWA separately from the State Biennial Performance Report as discussed in section 490.107(b). In this case, the State DOTs and the MPOs should coordinate to ensure that the MPOs' data are

reflected in the State report in a consistent manner.

2. The MPOs could submit their performance information to the State DOTs to be included in the State Biennial Performance Report. In this case, the State DOTs would be responsible to ensure the CMAQ performance plan requirements are met.

The FHWA requests comments on other possible options that provide a streamlined approach to meet the performance requirements as discussed above.

The FHWA proposes that, similar to the State DOT Biennial Performance Reports, an MPO would have three distinct performance reports (Baseline Performance Period, Mid Performance Period Progress, and Full Performance Period Progress). These distinct reports would contain different content, but would align with target establishment and other State DOT performance reporting requirements.

As part of the CMAQ performance plan submitted with the State DOT's Baseline Performance Period Report, the MPO would include baseline condition/performance for each applicable measure. This could result in several different baseline condition/performance: One for each urbanized area's traffic congestion measure and up to five<sup>84</sup> for the on-road mobile source emission measure. The FHWA intends that "baseline level," as used in 23 U.S.C. 149(l), has the same meaning as "baseline condition/performance" as used in this section. Interpreting these phrases as having the same meaning will help ensure that State DOTs and MPOs are reporting consistent baseline condition/performance information. For the traffic congestion measure, the baseline condition/performance would be the same as that reported by the State DOT(s) under section 490.107(b)(1)(ii)(B).

The report would also include the 2-year and 4-year targets for these measures for the performance period. The establishment of targets is required in section 490.105(f). An MPO would use the same geographic area for both reporting its baseline condition/performance and establishing targets. For the traffic congestion measure, as described in section 490.105(f)(5), 2-year and 4-year targets would be identical to the targets reported by the relevant State DOT(s) under section 490.107(b)(1)(ii)(A). As required by 23 U.S.C. 149(l)(1)(C), the report would describe projects identified for CMAQ

funding and how such projects would contribute to achieving the performance targets for the traffic congestion and on-road mobile source emissions measures.

The FHWA proposes that the CMAQ performance plan submitted with the State DOT's Mid Performance Period Progress Report would include the actual 2-year condition/performance derived from the latest measured condition/performance through the midpoint of the performance period for an MPO-reported traffic congestion target and the estimated cumulative emissions reduction resulting from CMAQ projects in the CMAQ Public Access System for each MPO-reported on-road mobile source emissions target. For the traffic congestion measure, the actual 2-year condition/performance would be identical to the 2-year condition/performance reported by the relevant State DOT(s) under section 490.107(b)(2)(ii)(A). For the on-road mobile source emissions measure, an MPO should use the same process the State DOT uses for determining the actual condition/performance, which is described in relation to section 490.107(b)(2)(ii). As required by 23 U.S.C. 149(l)(2), MPOs would assess the progress of the projects identified in the CMAQ performance plan submitted with the Baseline Performance Period Report toward achieving the 2-year targets for traffic congestion and on-road mobile source emissions measures. When doing this assessment, the MPO would compare the actual 2-year condition/performance with the 2-year target and document any reasons for differences between these two values.

If an MPO adjusts its 4-year target, the MPO would report that adjusted target, as provided in section 490.105(f)(7) and (f)(8). In addition, an MPO would update its description of projects identified for CMAQ funding and how those updates would contribute to achieving the performance targets for these measures. If an MPO has not adjusted its targets or does not have any changes to its description of projects, it may comply with this proposed requirement by making a statement to that effect.

The FHWA proposes the CMAQ performance plan submitted with the State DOT's Full Performance Period Progress Report would include the actual 4-year condition/performance derived from the latest measured condition/performance through the end of the performance period for each MPO-reported traffic congestion and estimated cumulative emissions reductions resulting from CMAQ projects in the CMAQ Public Access System for each MPO reported on-road

<sup>82</sup> Metropolitan Planning Area Data: FHWA HEPGIS (Accessed on 5/1/2015): <http://hepgis.fhwa.dot.gov/hepgismaps11/ViewMap.aspx?map=MPO+Boundaries\MP0+Boundary#>. The nonattainment/maintenance status of the MPOs areas was verified on 5/1/2015 based on EPA's Green Book (updated on April 14, 2015): <http://www.epa.gov/oaqps001/greenbk/gisdownload.html>. Population Data for Urbanized Areas (Accessed on 8/7/2013): <https://www.census.gov/geo/reference/ua/urban-rural-2010.html>.

<sup>83</sup> Document "CMAQ Measure States and MPOs.pdf" in the docket.

<sup>84</sup> Measure for each of the applicable criteria pollutants and precursors (VOC, NO<sub>x</sub>, CO, PM<sub>2.5</sub> and/or PM<sub>10</sub>).



mobile source emissions target. For the traffic congestion measure, the actual 4-year condition/performance would be identical to the 4-year condition/performance reported by the relevant State DOT(s) under section 490.107(b)(3)(ii)(A). For the on-road mobile source emissions measure, an MPO should use the same process used by the State DOT for determining the actual 4-year condition/performance, which is described in relation to section 490.107(b)(3)(ii). As required by 23 U.S.C. 149(l)(2), MPOs would assess the progress of the projects identified in the CMAQ performance plan submitted with the Baseline Performance Period Report and any updates to that description identified in the CMAQ performance plan submitted with the Mid Performance Period Progress Report toward achieving the 4-year targets for these measures. When doing this assessment, the MPO would compare the actual 4-year condition/performance with the 4-year target and document any reasons for differences between these two values.

The FHWA has proposed that MPOs submit three distinct CMAQ performance plans with the State DOT's biennial performance reports (Baseline Performance Period, Mid Performance Period Progress, and Full Performance Period Progress). Because these plans would be required for consecutive 4-year performance periods, the information provided in the CMAQ performance plan submitted with the State DOT's Full Performance Period Report would be provided at the same time and may include some of the same information as the CMAQ performance plan submitted with the State DOT's Baseline Performance Period Report for the next performance period. As FHWA expects that State DOTs would provide all of the required baseline and progress reporting information at one time, and the MPO CMAQ performance plan would be submitted in a similar fashion. The proposed regulations identify three distinct plans to clarify the purpose and timing of information that would be required to be reported every 2 years. The FHWA intends to issue guidance to assist MPOs in developing and submitting these biennial plans.

The FHWA also seeks comments on other issues or problems State DOTs and MPOs might anticipate in meeting the reporting requirements of 23 U.S.C. 149(l) and 150(e) for the performance measures related to the CMAQ program and ideas for resolving any anticipated issues or problems.

Discussion of Section 490.109  
Assessing Significant Progress Toward Achieving the Performance Targets for the National Highway Performance Program and National Highway Freight Program

Significant progress determinations for measures identified in section 490.207(a) are discussed in section 490.211 of the first performance measure rulemaking, published as a final rule March 15, 2016; and significant progress determination specific to pavement condition measures in sections 490.307(a)(1) through (c)(4) and bridge condition measures in sections 490.407(c)(1) and (c)(2) are included in the second performance measure NPRM. The discussions specific to these measures will not be repeated in this NPRM. Please see the docket for Subpart A in its entirety for additional information.

In section 490.109, FHWA proposes the method by which FHWA would determine if a State DOT has achieved or is making significant progress toward its performance targets in the NHPP, as required by 23 U.S.C. 119(e)(7), and NHFP, as required 23 U.S.C. 167(j). This determination would involve the measures identified in section 490.105(c)(1) through (c)(5), which include the proposed measures in both this performance management NPRM and the second performance management NPRM, and section 490.105(c)(6). Although this determination could directly impact State DOTs, MPOs could also be indirectly impacted as a result of the link between metropolitan and statewide planning and programming decisionmaking. This rulemaking discusses the approach that would be taken by FHWA to assess State DOT performance progress, but does not include a discussion on the method that may be used by FHWA to assess the performance progress of MPOs. Interested persons should refer to the updates to the Statewide and Metropolitan Planning regulations (RIN 2125-AF52) for discussion on the review of MPO performance progress.

The FHWA recognizes that there may be factors outside of a State DOT's control that could impact its ability to achieve a target. The FHWA considered these factors in its evaluation of different approaches to implement this provision. A number of factors were raised as part of the performance management stakeholder outreach sessions regarding target establishment and progress assessment, including: The impact of funding availability on performance outcomes, the reliability of

the current state-of-practice to predict outcomes resulting from investments at a system level, the impact of uncertain events or events outside the control of a State DOT on performance outcomes, the need to consider multiple performance priorities in making investment trade-off decisions, and the challenges with balancing local and national objectives.

The FHWA recognizes that the State DOTs and MPOs have to consider multiple performance priorities in making investment trade-off decisions and that there are challenges with balancing local and national objectives. During outreach, stakeholders<sup>85</sup> raised a number of concerns regarding progress assessment, including:

- The desire to foster balanced and sound decisions rather than focusing on achieving one target at the expense of another;
- the desire to assess progress using quantitative and qualitative input; and
- the desire to avoid unachievable targets.

Thus, FHWA plans to implement an approach that balances the uncertainty facing State DOTs in predicting future performance with the need to provide for a fair and consistent process to determine compliance. The approach being proposed by FHWA is based on the following principles:

- Focus the Federal-aid highway program on the MAP-21 national goals in 23 U.S.C. 150(b); and
- recognize that State DOTs need to consider fiscal constraints in their target establishment.

Because targets would be established for an entire system, FHWA acknowledges that State DOTs may make small incremental changes within that system that would not necessarily appear in a quantitative assessment. In some instances, even a modest increase in improvement when evaluating on a system-wide basis, would constitute significant progress. Accordingly, FHWA proposes that for each NHPP target (targets for the measures identified in section 490.105(c)(1) through (c)(5)) and each NHFP (targets for the measures identified in section 490.105(c)(6)), progress toward the achievement of the target would be considered "significant" when either of the following occur: The actual condition/performance level is equal to or better than the State DOT established target, or the actual condition/

<sup>85</sup> AASHTO (2013), *SCOPM Task Force Findings on MAP-21 Performance Measure Target-Setting*. [http://scopm.transportation.org/Documents/SCOPM%20Task%20Force%20Findings%20on%20Performance%20Measure%20Target-Setting%20FINAL%20v2%20\(3-25-2013\).pdf](http://scopm.transportation.org/Documents/SCOPM%20Task%20Force%20Findings%20on%20Performance%20Measure%20Target-Setting%20FINAL%20v2%20(3-25-2013).pdf).



performance is better than the State DOT identified baseline of condition/performance. The FHWA believes that any improvement over the baseline, which represents a 0.1 percent improvement, should be viewed as significant progress considering the fiscal challenges and financial uncertainties many State DOTs are faced with today. Although a change of 0.1 percent may appear insignificant, this degree of improvement to a highway network is difficult to achieve. In many State DOTs this level of change would require improvements to hundreds, if not thousands, of lane-miles of highway network. The FHWA reviewed the extent to which State DOTs have been able to actually change system conditions/performance of their highway networks in recent years to validate this view of significant progress. This review supports FHWA's belief that any improvement should be considered significant, as many State DOTs have seen minimal or no improvements in the condition/performance of their highway networks in recent years. This is the case even with the influx of funding State DOTs were able to utilize through the American Recovery and Reinvestment Act of 2009. For these reasons, FHWA believes that any improvement over the baseline should be viewed as significant progress.

The FHWA believes that State DOTs, through a transparent and public process, would want to establish or adjust targets that strive to improve the overall performance of the NHS and freight movement. For this reason, FHWA did not want to propose an approach to determine significant progress that would be difficult to meet, as it could discourage the establishment of "reach" targets due to the perceived uncertainties that would need to be assumed by State DOTs. The FHWA feels that the progress assessment approach proposed in this NPRM, which considers improvement from baseline conditions to be significant, would not discourage State DOTs from establishing targets to improve the overall condition/performance of the Interstate and non-Interstate System NHS, and freight movement.

The FHWA is proposing a three-step process to determine if a State DOT has made significant progress toward the achievement of its NHPP and NHFP targets. The FHWA would use this process to make a significant progress determination for the NHPP and NHFP each time the State DOT submits its Mid Performance Period Progress Report and its Full Performance Period Progress Report. This process is summarized

below and discussed in more detail for each of the proposed regulations.

- *Step 1: Reporting Progress in the Biennial Performance Reports*—The State DOT would evaluate and report the progress it has made both toward the achievement of each individual target and for all related targets collectively established for the NHPP and NHFP measures (measures identified in section 490.105(c)(1) through(c)(5) and 490.105(c)(6)). This evaluation would be documented in the discussion of progress achieved since the most recent report. The State DOT would document in its Biennial Performance Reports any extenuating circumstances outside its control that may have impacted its ability to achieve progress on any of the targets.

- *Step 2: Consideration of Extenuating Circumstances*—The FHWA would review the completeness of the content provided in their Biennial Performance Reports and would determine if any documented extenuating circumstances would be considered in the progress assessment. A State DOT would provide any additional information to FHWA, upon request, if the report is incomplete.

- *Step 3: Evaluation of Actual Condition/Performance*—The FHWA would determine if the State DOT has made significant progress for each target using the following sources:

- Data contained within the HPMS for targets established for pavement condition measures, as specified in sections 490.105(c)(1) and (c)(2);
- Data contained in the NBI for targets established for bridge condition measures, as specified in section 490.105(c)(3);
- Data contained within the HPMS for targets established for system performance measures, as specified in sections 490.105(c)(4) and (c)(5);
- Data contained within the HPMS for targets established for Freight performance measures, as specified in sections 490.105(c)(6);

- Data to define the urbanized area boundary and NHS limits as documented in the State DOT Baseline Performance Period Report; and
- Population data, as defined by the most recent U.S. Decennial Census that was available when targets were first reported by the State DOT in their Baseline Performance Period Report.

The FHWA would use these biennial determinations to assess if the State DOT is in compliance with the NHPP<sup>86</sup> and NHFP<sup>87</sup> performance achievement provisions. For the NHPP and NHFP,

the State DOTs are required to achieve or make significant progress toward their targets every biennial reporting period (every 2 years), and are to take additional reporting actions if FHWA determines significant progress is not made. The FHWA plans to issue guidance, following the publication of the Final Rule, establishing when the determination notification to the State DOTs will be made.

For the NHPP, the requirement for State DOTs to take the additional reporting actions would be based on each FHWA biennial determination. This is a change from the second NPRM, which proposed that the requirement for a State DOT to take the additional reporting actions would be based on two consecutive FHWA biennial determinations. As discussed in previous sections, the enactment of FAST Act introduced the significant progress determination requirements for the NHFP and removed the requirement that two consecutive reports (4 year period) be used in determining if a State DOT would be required to take additional reporting actions when the State DOT has made significant progress toward its NHPP targets. Thus, in this NPRM, the language has been changed to reflect the statutory language in FAST Act. The FHWA proposes, in this NPRM, that FHWA would determine whether or not a State DOT has achieved or make significant progress toward its NHPP and NHFP targets every biennial reporting period, and the determination on whether or not a State DOT would take additional reporting actions based on each of FHWA biennial determination.

In section 490.109(a), FHWA proposes that it would determine whether a State DOT has achieved or has made significant progress toward achieving each of the State DOT's targets for each of the NHPP and NHFP measures separately.

The FHWA proposes in section 490.109(b) that FHWA would determine whether a State DOT has or has not made significant progress for NHPP and NHFP targets at the midpoint and the end of each performance period.

In section 490.109(c), FHWA proposes that FHWA would determine significant progress toward the achievement of a State DOT's NHPP and NHFP targets after the State DOT submittal of the Mid Performance Period Progress Report and after the State DOT submittal of the Full Performance Period Progress Report. This process, which is described in the discussion of section 490.107(b), would follow the proposed schedule illustrated in Figures 4 and 5. Following this proposed frequency, the FHWA would

<sup>86</sup> 23 U.S.C. 119(e)(7).

<sup>87</sup> 23 U.S.C. 167(j).

make a significant progress determination for the NHPP and NHFP and assess compliance with the NHPP and NHFP performance achievement provisions every 2 years.

The FAST Act introduced 23 U.S.C. 167(j), which says “If the Administrator determines that a State has not met or made significant progress toward meeting the performance targets related to freight movement of the State established under section 150(d) by the date that is 2 years after the date of the establishment of the performance targets, the State shall include in the next report submitted under section 150(e) a description of the actions the State will undertake to achieve the targets, including . . .” The FHWA interprets the 2-year period referenced in 23 U.S.C. 167(j) as 2 years after the start of the performance period, which is consistent with 150(e) reporting requirements and the reporting regulations of this NPRM. This 2 year period is the period of time the State DOT has to establish targets, collect data, and provide information to FHWA. This interpretation allows FHWA to determine if a State DOT has made significant progress on its 2-year targets following the submittal of its Mid Performance Period Progress Report, and on its 4-year targets following the submittal of its Full Performance Period Progress Report.

The FHWA would notify all State DOTs within a reasonable time of the final determination and would advise on any subsequent need to address progress achievement in their next biennial reports (see 490.109(f)). The data reported to FHWA by the States would be available to the public and would be used to communicate a national performance story. The FHWA is developing a public Web site to share

performance related information. This information would provide for greater transparency for FHWA programs.

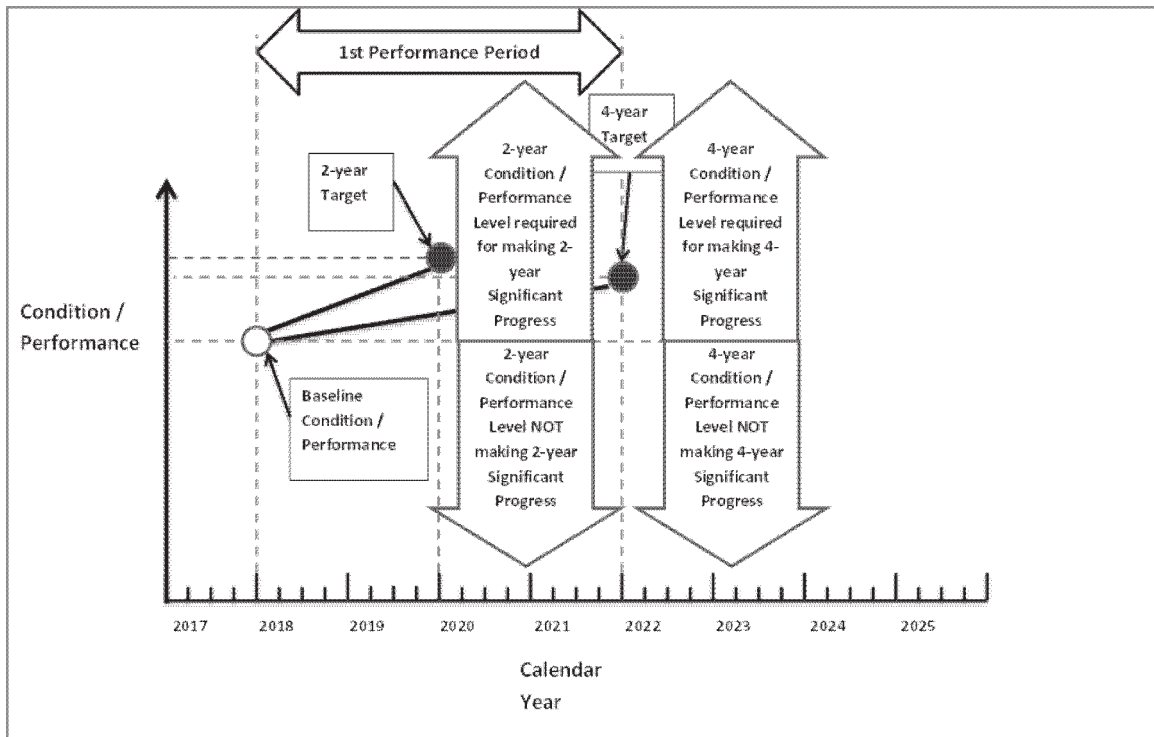
The FHWA also expects that during a performance period, State DOTs would routinely monitor leading indicators, such as program delivery status, to assess if they are on track to make significant progress toward achievement of their NHPP and NHFP targets. If a State DOT anticipates it may not make significant progress, it is encouraged to work with FHWA and seek technical assistance during the performance period to identify the actions that can be taken to improve progress toward making significant progress. The FHWA also seeks comment on whether it should require State DOTs to more frequently (e.g., annually) evaluate and report the progress they have made.

The FHWA desires to use national datasets in a consistent manner as a basis for making its NHPP and NHFP significant progress determinations. Thus, in section 490.109(d), FHWA proposes to use specific data sources that could be accessed by State DOTs and others if they chose to replicate FHWA’s determinations. The data in these sources, specifically the HPMS, would be provided by State DOTs as proposed in Subparts E–F. To ensure a repeatable process, in section 490.109(d), FHWA is proposing to establish a specific date (August 15) to extract data from the HPMS for the measures proposed in this NPRM, as the HPMS is often updated. This “extraction” date is considered the earliest time data can be available in a national data source. This proposed “extraction” date considers the time State DOTs typically need to submit the data to HPMS, to process raw data, and to address missing or incorrect data that may be identified as a result of quality

assessments conducted by the State DOT and/or FHWA. The proposed “extraction” date is necessary for FHWA to make significant progress determinations in a timely manner. The FHWA is proposing to extract metric data from the HPMS on August 15 to determine the actual performance of Interstate System and non-Interstate NHS for the Reliability and Peak Hour Travel Time measures, and Freight measures, as specified in sections 490.105(c)(4), (c)(5), and (c)(6). This date is needed to provide FHWA with sufficient time to make a determination of significant progress for NHPP and NHFP targets.

In section 490.109(e), FHWA proposes a process for the significant progress determination for each individual NHPP and NHFP target. In paragraph (e)(1), FHWA proposes that FHWA would assess how the target established by the State DOT compares to the actual condition/performance using the data/information sources described in section 490.109(d). This process is generally outlined in Step 3 of the 3-step process described earlier. The FHWA proposes, in section 490.109(e)(2), that FHWA would determine that a State DOT has made significant progress for each 2-year or 4-year target if either: (1) The actual condition/performance level is better than the baseline condition/performance reported in the State DOT Baseline Performance Period Report; or (2) the actual condition/performance level is equal to or better than the established target.

For illustrative purposes, 2-year and 4-year evaluations where improving targets were established for the first performance period are shown in Figure 6.



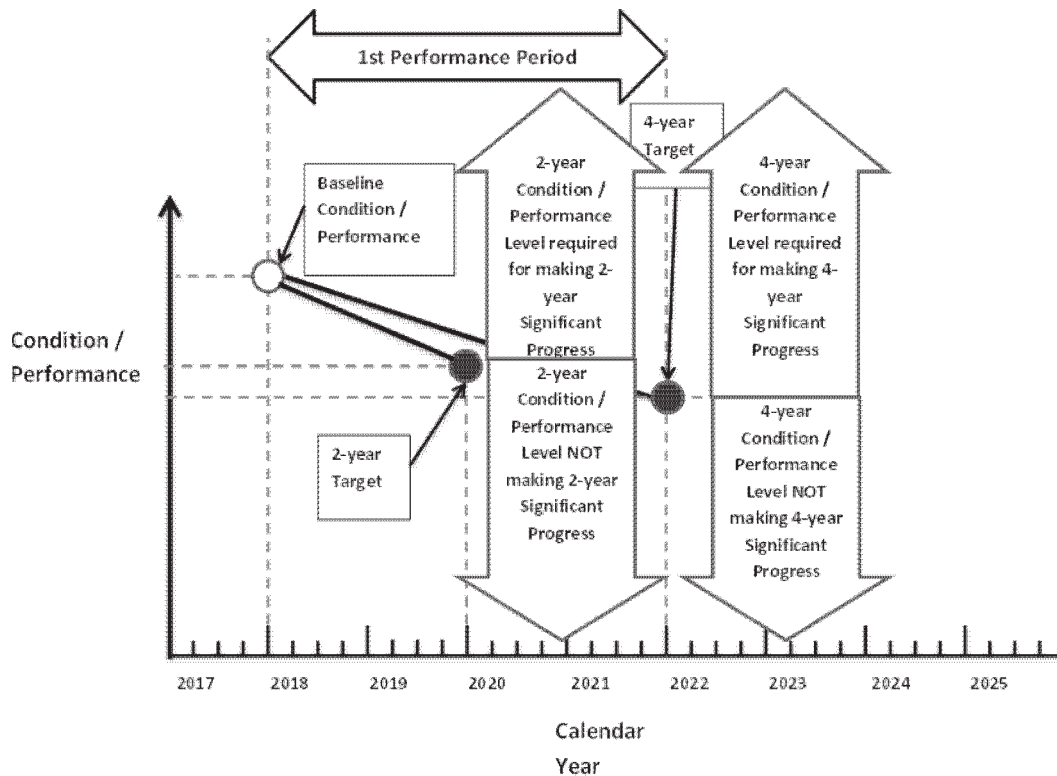
**Figure 6 – First Performance Period: 2- and 4-year Significant Progress Determination for a 2- and 4-year Target (anticipated improving scenario)**

The FHWA recognizes that State DOTs have to consider their fiscal situation in target establishment and acknowledges that, in some cases, anticipated condition/performance could be projected to decline from (or sustain) the baseline condition/performance due to lack of funding, changing priorities, etc. In these cases, State DOTs should document why they

project a decline in condition in their Biennial Performance Reports as discussed in paragraph 490.107(b)(1)(ii)(A). The FHWA proposes that significant progress could still be made in cases where the established target indicates a decline from (or sustain) the baseline condition/performance. For the decline/sustain condition/performance scenario, FHWA

proposes that significant progress is made for a target when actual condition/performance level is equal to or exceeds the target. For illustrative purposes, 2-year and 4-year evaluations where declining targets were established for the first performance period are shown in Figure 7.





**Figure 7 - First Performance Period: 2-and 4-year Significant Progress Determination for a 2-and 4-year Target (anticipated decline/sustain scenario)**

As discussed in section 490.105(e)(7), FHWA recognizes the data limitation issues associated with the non-Interstate NHS travel time reliability measure (in section 490.507(a)(2)) prior to the start of the first performance period. Considering this limitation, FHWA proposes in section 490.105(e)(7) that for the first performance period, the State DOTs would not be required to report their 2-year targets and their baseline condition for the non-Interstate NHS travel time reliability measure at the beginning of the first performance period. Consequently, FHWA proposes in section 490.109(e)(3) that for the first performance period only, progress toward the achievement of 2-year targets for non-Interstate NHS travel time reliability measure would not be subject to FHWA determination under section 490.109(e)(2).

The FHWA proposes to accomplish this by categorizing the 2-year targets for the non-Interstate NHS travel time reliability measure as “progress not determined,” which would exclude these targets from the FHWA determination under section 490.109(e)(2). The FHWA expects that some State DOTs would adjust their established 4-year targets at the midpoint of the first performance period because they may have had limited

baseline data available to them when they first establish the 4-year target. For the first performance period, FHWA would determine significant progress toward the achievement of a State DOT’s non-Interstate NHS travel time reliability measure targets based on HPMS data extracted on August 15 of the year in which the Full Performance Period Progress Report is due. The FHWA recognizes that some State DOTs would be able to establish and report baseline condition and 2-year targets for the proposed non-Interstate NHS travel time reliability measure in their first Baseline Performance Period Report. However, FHWA proposes that the process established in this section apply to all State DOTs in order to ensure uniformity in the progress determination process.

In section 490.109(e)(4), FHWA proposes that if a State DOT does not provide sufficient data and/or information for FHWA to make a significant progress determination for NHPP or NHFP target(s), then that State DOT would be deemed to not have made significant progress for those individual target(s).

In section 490.109(e)(5), if a State DOT encounters extenuating circumstances beyond its control, the State DOT would document the

explanation of the extenuating circumstances in the biennial performance report. This explanation would address factors that the State DOT could not have foreseen and were outside of its control when it established targets at the beginning of the performance period. If the explanation is accepted by FHWA, then the associated NHPP or NHFP target(s) would be classified as “progress not determined” and would not be subject to the requirement under section 490.109(f). If the explanation is not accepted by FHWA, then the State DOT would be deemed to not have made significant progress for the target. Proposed extenuating circumstances are listed in 490.109(e)(5). The list includes:

- Natural or man-made disasters causing delay in NHPP or NHFP project delivery, extenuating delay in data collection, and/or damage/loss of data system;
- sudden discontinuation of Federal Government furnished data due to natural and man-made disasters or lack of funding; and/or
- new law and/or regulation directing State DOTs to change metric and/or measure calculation.

In section 490.109(f), pursuant to 23 U.S.C. 119(e)(7) and 23 U.S.C. 167(j), FHWA has proposed that if that if

FHWA determines that a State DOT has not made significant progress for any NHPP or NHFP targets in a biennial determination, then the State DOT would include in its next Biennial Performance Report a description of the actions the State DOT will undertake to improve conditions/performances with respect to all related measures within the measure group. The FHWA proposed the related measures be grouped as follows:

- Interstate System pavement condition—both proposed measures Percentage of pavements of the Interstate System in Good condition in section 490.307(a)(1) and Percentage of pavements of the Interstate System in Poor condition in section 490.307(a)(2);
- Non-Interstate NHS pavement condition—both proposed measures Percentage of pavements of the non-Interstate NHS in Poor condition in section 490.307(a)(3) and Percentage of pavements of the non-Interstate NHS in Good condition in section 490.307(a)(4);
- NHS bridge condition—both measures Percentage of NHS bridges in Good condition in section 490.407(c)(1) and Percentage of NHS bridges in Poor condition in section 490.407(c)(2);
- NHS travel time reliability—both measures Percent of the Interstate System providing for Reliable Travel

Times in section 490.507(a)(1) and Percent of the non-Interstate NHS providing for Reliable Travel Times in section 490.507(a)(2); and

- Peak Hour Travel Time for an Urbanized Area—both measures Percent of the Interstate System where peak hour travel times meet expectations in section 490.507(b)(1) and Percent of the non-Interstate NHS where peak hour travel times meet expectations in section 490.507(b)(2). Please note the grouping for these measures is for each urbanized area separately.

- Freight movement on the Interstate System—both measures Percent of the Interstate System Mileage providing for Reliable Truck Travel Times in section 490.607(a), and Percent of the Interstate System Mileage Uncongested in section 490.607(b).

As a general example of this proposed approach, when a State DOT has not made significant progress for any one of the targets for NHS travel time reliability measures (Interstate or non-Interstate NHS), then that State DOT would, at a minimum, include in its next Biennial Performance Report a description of the actions the State DOT will undertake to improve conditions for NHS travel time reliability measures (Interstate or non-Interstate NHS). As for the peak hour travel time measures, if

significant progress is not made for either urbanized area specific target (Interstate or non-Interstate NHS), as described in section 490.105(e)(8), for an urbanized area, then the State DOT would document the actions it will take to improve both the Interstate and non-Interstate NHS peak hour travel times such that both targets for the peak hour travel time measures will be achieved for that urbanized area.

States must provide description of the actions they will undertake in the next Biennial Performance Report. The FHWA strongly encourages States to add a description of their planned actions to their most recent Biennial Report within 6 months of the FHWA significant progress determination to ensure actions to achieve targets are taken in a timely manner, and to improve progress toward making significant progress for the applicable targets.

Tables 10 and 11 illustrate this proposed determination method for both the NHPP and NHFP measures. Table 10 includes the significant progress determination results in 2021 for the midpoint of the 1st performance period and the significant progress determination in 2023 for the end of the 1st performance period.

**Table 10 – Example of NHPP and NHFP Significant Progress Determinations in 2021 and 2023**

Measure	Baseline Condition / Performance for the 1 <sup>st</sup> Performance Period	Significant Progress Determination in 2021 for the midpoint of the 1 <sup>st</sup> Performance Period			Significant Progress Determination in 2023 for the end of the 1 <sup>st</sup> Performance Period			Measure Group
		2-year target	2-year Condition / Performance	Significant progress made at the midpoint?	4-year target	4-year Condition / Performance	Period-end Significant progress made at the end of period?	
<i>The Percentage of pavements in Good Condition on Interstate System – statewide</i>	<b>40.0%</b>	N/A	40.0%	<b>Progress not determined</b> <sup>88</sup>	38.5%	37.7%	<b>No</b>	Interstate System pavement condition
<i>The Percentage of pavements in Poor Condition on Interstate System – statewide</i>	<b>7.0%</b>	N/A	7.0%	<b>Progress not determined</b> <sup>89</sup>	5.2%	6.0%	<b>Yes</b> by actual being better than the baseline	
<i>Percentage of pavements in Good Condition on non-Interstate NHS – statewide</i>	<b>35.0%</b>	34.4%	34.4%	<b>Yes</b> by achieving the 2-year target	33.3%	33.4%	<b>Yes</b> by achieving the 4-year target	Non-Interstate NHS pavement condition
<i>Percentage of pavements in Poor Condition on non-Interstate NHS – statewide</i>	<b>3.8%</b>	2.9%	2.9%	<b>Yes</b> by achieving the 2-year target	2.3%	2.2%	<b>Yes</b> by achieving the 4-year target	
<i>Percentage of NHS bridges in Good Condition – statewide</i>	<b>35.0%</b>	34.5%	34.9%	<b>Yes</b> by achieving the 2-year target	34.0%	33.4%	<b>No</b>	NHS Bridge condition

<sup>88</sup> The FHWA proposes to categorizing the 2-year targets for the Interstate pavement condition measure as “progress not determined” for the first performance period. Please see sections 490.105(e)(7) and 490.109(e)(3) in the Second Performance Measure NPRM.

<sup>89</sup> Ibid



Measure	Baseline Condition / Performance for the 1 <sup>st</sup> Performance Period	Significant Progress Determination in 2021 for the midpoint of the 1 <sup>st</sup> Performance Period			Significant Progress Determination in 2023 for the end of the 1 <sup>st</sup> Performance Period			Measure Group
		2-year target	2-year Condition / Performance	Significant progress made at the midpoint?	4-year target	4-year Condition / Performance	Period-end Significant progress made at the end of period?	
Percentage of NHS bridges in Poor Condition – statewide	10.0%	9.3%	8.9%	Yes by achieving the 2-year target	7.5%	8.5%	Yes by actual being better than the baseline	
Percent of the Interstate System providing for Reliable Travel Times– statewide	80.0%	81.0%	79.8%	No	80.0%	80.2%	Yes by achieving the 4-year target	NHS Reliable Travel Times
Percent of the non-Interstate NHS providing for Reliable Travel Times– statewide	87.5%	N/A	87.5%	Progress not determined <sup>90</sup>	88.8%	89.5%	Yes by achieving the 4-year target	
Percent of the Interstate System where peak hour travel times meet expectations – Urbanized Area A	75.0%	76.3%	75.1%	Yes by actual better than the baseline	77.5%	75.5%	Yes by actual being better than the baseline	Peak Hour Travel Times for Urbanized Area A
Percent of the non-Interstate NHS where peak hour travel times meet expectations – Urbanized Area A	62.5%	64.4%	62.9%	Yes by actual better than the baseline	65.0%	60.0%	No	

<sup>90</sup> The FHWA proposes to categorizing the 2-year targets for the non-Interstate NHS travel time reliability measure as “progress not determined” for the first performance period. Please see sections 490.105(e)(10) and 490.109(e)(3).

Measure	Baseline Condition / Performance for the 1 <sup>st</sup> Performance Period	Significant Progress Determination in 2021 for the midpoint of the 1 <sup>st</sup> Performance Period			Significant Progress Determination in 2023 for the end of the 1 <sup>st</sup> Performance Period			Measure Group
		2-year target	2-year Condition / Performance	Significant progress made at the midpoint?	4-year target	4-year Condition / Performance	Period-end Significant progress made at the end of period?	
Percent of the Interstate System where peak hour travel times meet expectations – <b>Urbanized Area B</b>	55.0%	55.3%	56.1%	Yes by achieving the 2-year target	55.5%	57.5%	Yes by achieving the 4-year target	Peak Hour Travel Times for Urbanized Area B
Percent of the non-Interstate NHS where peak hour travel times meet expectations – <b>Urbanized Area B</b>	62.5%	63.1%	62.9%	Yes by actual better than the baseline	63.8%	61.3%	No	
The Percent of the Interstate System Mileage providing for Reliable Truck Travel Times – <b>statewide</b>	40.0%	40.0%	40.0%	Yes by achieving the 2-year target	38.5%	37.7%	No	Freight Movement on the Interstate System
The Percent of the Interstate System Mileage Uncongested – <b>statewide</b>	70.0%	70.5%	70.5%	Yes by achieving the 2-year target	72.0%	71.3%	Yes by actual being better than the baseline	

In Table 10 above, the statewide target for the measure Percent of the Interstate System providing for Reliable Travel Times did not make significant progress for the 2-year target in FHWA's biennial determination in 2021. In this example, the State DOT would include, at a minimum, in its next Biennial Performance Report (*i.e.* Full Performance Period Progress Report in 2022) a description of the actions the State DOT will undertake to achieve its targets with respect to both Percent of the Interstate System providing for Reliable Travel Times and the Percent of the non-Interstate NHS providing for Reliable Travel Times measures. The FHWA strongly encourages State DOTs to add a description of their planned actions to their most recent Biennial Reports (*i.e.* 2020 Mid Performance Period Progress Reports) within 6

months of the FHWA significant progress determination to ensure that State DOTs take actions to achieve targets in a timely manner and to improve progress toward making significant progress for the applicable targets.

Also in Table 10, for the hypothetical "Urbanized Area A," the urbanized area target for the measure Percent of the non-Interstate NHS where peak hour travel times meet expectations did not make significant progress for the 4-year target in FHWA's biennial determination in 2023. In this example, the State DOT would include in its next Biennial Performance Report (*i.e.*, Mid Performance Period Progress Report in 2024) a description of the actions the State DOT will undertake to improve its performance with respect to both "Urbanized Area A's relevant measures:

Percent of the non-Interstate NHS where peak hour travel times meet expectations and the Percent of the Interstate System where peak hour travel times meet expectations measures. In addition, this hypothetical State DOT did not make significant progress for the statewide target for the measure The Percent of the Interstate System Mileage providing for Reliable Truck Travel Times for the 4-year target in FHWA's determination in 2023. So the State DOT would, at a minimum, include in its next Biennial Performance Report (*i.e.* Mid Performance Period Progress Report in 2024) a description of the actions the State DOT will undertake to achieve targets with respect to both the Percent of the Interstate System Mileage providing for Reliable Truck Travel Times and the Percent of the Interstate System Mileage

Uncongested measures. The FHWA strongly encourages State DOTs to add a description of their planned actions to their most recent Biennial Reports (*i.e.* 2022 Full Performance Period Progress Reports) within 6 months of the FHWA significant progress determination to ensure that State DOTs take actions to achieve targets in a timely manner and to improve progress toward making significant progress for the applicable targets.

The FHWA believes that any one of the targets would impact other targets in the same measure group and that the State DOT's descriptions of the actions for all targets in a same measure group would be more logical and sensible in managing performance of relevant network rather than isolated description on a subset of the network. So, FHWA proposes that a State DOT would provide a description of the actions the State DOT will undertake to achieve all targets in the same measure group.

As indicated in the previous discussion in section 490.109, FHWA would make the significant progress determination each time the State DOT submits its Mid Performance Period Progress Report and its Full Performance Period Progress Report (every 2 years). In section 490.109(f)(2), FHWA proposes the consequences for not making significant progress for the NHFP measures in 490.105(c)(6). Pursuant to 23 U.S.C. 167(j), if a State DOT has not made significant progress toward the achievement of NHFP targets in a single FHWA biennial determination, then the State DOT must take the required actions in section 490.109(f)(2).

When a State DOT does not make significant progress toward the achievement of NHFP targets, it must include a description of the actions the State DOT will undertake to achieve the targets in its next Biennial Performance Report. This discussion must include:

- A description of the actions the State DOT will undertake to achieve targets including an identification of significant freight system trends, needs and issues within the State;
- a description of the freight policies and strategies that will guide the freight-related transportation investments of the State;
- an inventory of freight bottlenecks with the State and a description of the ways in which the State DOT is allocating national highway freight program funds to improve those bottlenecks; and
- a description of the actions the State DOT will undertake to meet the performance targets of the State.

For the purpose of the requirements in section 490.109(f)(2), the State DOT may reference the Statewide Freight Plan elements that identify freight system trends, needs and issues, as well as the freight policies and strategies in the Plan to guide investment. Under Section 150(e), State DOTs are already responsible for reporting on ways in which the State DOT is addressing freight bottlenecks, which are defined as those segments of the Interstates not meeting the threshold levels for congestion and average speed, as well as any other bottlenecks the State DOT wishes to include and anything that is identified in the National Freight Strategic Plan. The State DOT will provide an inventory of those segments as defined for section 150(e) and any other locations the State DOT wishes to reference as a bottleneck, as well as any bottleneck referenced in the National Freight Strategic Plan. Additionally, the State DOT will describe how funding is or will be allocated to improve freight fluidity through bottlenecks, as well as other actions to meet performance targets of the Interstates in the State.

In section 490.109(f)(3), FHWA proposes that State DOTs who fail to make significant progress for either the NHPP or NHFP should amend their Biennial Performance Reports within 6 months of FHWA's determination to include the actions they will take to achieve their targets. State DOTs are required to include description of the actions the State DOT will undertake to achieve targets in its next Biennial Performance Reports to meet the requirement in 23 U.S.C. 119(e)(7), as described in paragraph (f) of this section. State DOTs are encouraged to amend their most recent Biennial Performance Reports to include this information. As discussed in sections 490.107(b)(2)(ii)(F) and 490.107(b)(3)(ii)(E), all State DOTs are required to discuss the progress they have made toward the achievement of targets established for the NHPP and NHFP measures in each of their Biennial Performance Reports. The FHWA expects State DOTs would routinely monitor leading indicators, such as program delivery status and measured data, to assess if they are on track to make significant progress for their NHPP and NHFP targets and expects State DOTs to be aware of their progress prior to the time of each Biennial Performance Report. As described in the discussion of section 490.109(c), if a State DOT anticipates it may not make significant progress, it is encouraged to work with FHWA and seek technical assistance during the

performance period to identify the actions that can be taken in a timely manner to improve progress toward making significant progress for the targets reported in subsequent Biennial Performance Reports. Thus, in section 490.109(f)(3), FHWA proposes that the State DOT should, within 6 months of the significant progress determination, amend its Biennial Performance Report to document the information specified in this section to ensure actions are being taken to achieve targets.

## Discussion of Section

### 490.111 Incorporation by Reference

In the second performance measure NPRM, FHWA had proposed to incorporate the proposed HPMS Field Manual to codify the data requirements for measures and to be consistent with HPMS reporting requirements. In this NPRM, FHWA proposes to extend that incorporation to subparts E through G. This would codify the data requirements for these measures and ensure consistency with HPMS reporting requirements. The proposed HPMS Field Manual includes detailed information on technical procedures to be used as reference by those collecting and reporting data for the proposed measures. The proposed HPMS Field Manual is included in the docket.

## 2. Subpart E: National Performance Management Measures to Assess Performance of the National Highway System

In this section, FHWA describes the proposed provisions in Subpart E, which would establish performance measures to assess the performance of the NHS. The discussions of the proposed requirements are organized as follows:

- Section 490.501 discusses the purpose of the subpart;
- Section 490.503 describes the applicability of the subpart;
- Section 490.505 presents the definitions;
- Section 490.507 discusses the performance measures;
- Section 490.509 describes the data requirements;
- Section 490.511 identifies how to calculate performance metrics; and,
- Section 490.513 presents how to calculate performance measures.

## Relationship Between Data Requirements, Calculation of Metrics, and Calculation of Measures

The following provides a general discussion of the relationship between data requirements, metrics, and measures. This relationship exists in this Subpart as well as Subparts F—H.



The proposed approach to determining individual measures includes data requirements, methods to calculate metrics, and methods to calculate measures. These are presented in sections 409.509, 490.511, and 409.513, respectively, and in similar sections in Subparts F—H. This proposed approach is presented as follows:

- **Data Requirements**—Outlines the data necessary to determine the required set of metrics that would be used to calculate the relevant measures. The type of data to be collected, the methods of data collection, and the extent and frequency of collection are described below and in the appropriate sections.
- **Metrics**—Describes the values that would be calculated from the data collected to support measure development and how to report the individual metrics.
- **Measures**—Provides the method to calculate the measures using reported metrics. State DOTs would use the calculated measures to report baseline condition or performance, establish targets, and report on progress.

#### Discussion of Section 490.501 Purpose

The FHWA is required, under 23 U.S.C. 150(c), to establish performance measures for State DOTs to use to assess the performance of the Interstate System and of the non-Interstate NHS. In this Subpart, FHWA proposes to establish two measures (1) a travel time reliability measure and (2) a peak hour travel time measure.

#### Discussion of Section 490.503 Applicability

The FHWA is proposing to establish a travel time reliability measure to apply to the entire NHS, including Interstate System and non-Interstate NHS elements. This measure would compare the longest travel time or slowest speed that occurs during a specified time frame to a reference travel time or speed for a transportation facility. A reliability measure is an indication of the extra time travelers must add to their trips in order to have a high degree of certainty that they will arrive at their destination on time. The FHWA has defined travel time reliability as the variability of travel times. Reliability, in the eyes of transportation system users, reflects how consistent a travel time is on portions of the NHS they are traveling on. The larger the variability of travel times is from day-to-day or hour-to-hour, the more the user has to plan for unexpectedly long travel times when planning a trip. For instance, to make sure a traveler arrives at the airport in time for a flight, the traveler may allot extra travel time to ensure that he/she

arrives in time in case of traffic incident, bad weather, or road construction along the way.

In more mathematical terms, reliability looks at the longer (all travelers) or longest (freight) travel times faced by users on portions of the NHS and compares these times to what is typically experienced by the system user (normal travel time). The larger the difference in these travel times, the worse the reliability is. In order to improve reliability, State DOTs and MPOs can implement operational and other strategies that are specifically designed make the system more reliable and efficient.

The reliability measure proposed in this NPRM would be reported as a Percent of the Interstate System providing reliable travel times and as the Percent of the Non-Interstate NHS providing reliable travel times. What that really means is that the number of miles on the Interstate or Non-Interstate NHS that performed in a reliable manner will be those miles where the travel time during any time period of the “daylight” hours (6 a.m. to 8 p.m.), 7 days a week, did not surpass the normal travel time by more 50 percent. The time periods during “daylight” hours include: 6 a.m. to 10 a.m. weekdays, 10 a.m. to 4 p.m. weekdays, 4 p.m. to 8 p.m. weekdays, and weekend days 6 a.m. to 8 p.m. If the longer travel times exceed the normal travel time by 50 percent or more in any of these time periods, then that section of road is considered unreliable. The FHWA experience and analysis led to the proposed threshold of 1.5, which reflects 50 percent longer travel times. The FHWA seeks comments on whether the 1.5 threshold is appropriate.

The calculations (or metrics) used to report this measure report the travel time reliability for every road segment on the NHS, so it will be readily apparent to State DOTs, MPOs, and the general public where the NHS road segments are that have a reliability problem.

The FHWA also notes two important refinements that strengthen travel time reliability measures: (1) Some operating agencies currently exclude the top 20 percent of longest travel times throughout the year when developing reliability-related measures because these travel times typically are due to extreme events that are beyond an agency’s control and should not be considered in the assessment of overall system performance; and (2) the reference travel time used in a reliability measure often reflects travel time associated with typical or average travel

speeds rather than the time associated with free flow travel speeds.

By establishing targets for, and reporting on this measure, State DOTs and MPOs can better identify and manage portions of the NHS where users experience unreliable travel. Note that FHWA is proposing a phase-in for the establishment of targets for the non-Interstate NHS reliability measure which is outlined in more detail under the discussion for section 490.105(e)(7).

The FHWA is proposing to establish a peak hour travel time measure to apply to the NHS, including Interstate System and non-Interstate NHS, within urbanized areas with a population over 1 million. By establishing targets for, and reporting on this measure, State DOTs and MPOs can better identify and manage portions of the NHS in major urbanized areas regardless of roadway ownership. As proposed, FHWA expects State DOTs and MPOs to use this measure to report one outcome for each of the applicable urbanized areas, even in cases where the boundary of the urbanized area intersects multiple States and metropolitan planning areas.

#### Discussion of Section 490.505 Definitions

The FHWA is proposing to define *Desired Peak Period Travel Time* as the travel time during 3 morning peak hours and the 3 evening peak hours, for each reporting segment in urbanized areas with a population over 1 million. State DOTs shall coordinate with MPOs when establishing the Desired Peak Period Travel Time. A State DOT and MPO(s) must use the same Desired Peak Period Travel Time for a particular reporting segment for the purposes of calculating the metrics and measures. The Desired Peak Period Travel Time should represent a travel time that is consistent with the intended plan and design of the roadway as part of a complete transportation system. The Desired Peak Period Travel Time should be developed in consultation with operating agencies as well. An operating agency is the agency or agencies that actually operate the NHS roadways at the most local level—this could be a State DOT, MPO, or a local (city, town, county) transportation agency. Operating means applying operational strategies in the day to day management of the NHS roadways; strategies such as posting travel times, sending out freeway service patrols, altering signal timing, and other items that could improve the efficiency and reliability of the NHS. The Desired Peak Period Travel Time will be used to calculate the Peak Hour measure which assesses peak hour travel and should represent a

travel time that is consistent with the intended plan and design of the roadway as a part of a complete transportation system.

The FHWA is proposing to define *Level of Travel Time Reliability* (LOTR) as a comparison, expressed as a ratio, of the 80th percentile travel time of a reporting segment to the “normal” (50th percentile) travel time of a reporting segment occurring throughout a full calendar year. The 80th percentile travel time reflects the longer travel times to make a trip. The FHWA chose the 80th percentile travel time because it reflects the travel time where operational strategies can make the most impact on improving reliability. The closer the 80th percentile travel time is to the normal (50th percentile) travel time, the better the reliability. The FHWA seeks comments on this methodology.

The FHWA is proposing to define *Normal Travel Time* as the time expected of Interstate System and non-Interstate NHS roadway users to travel when the system is predominantly in use. This time is proposed to be defined as the 50th percentile travel time occurring during this defined time period. The 50th percentile relates to the travel time that occurs in the middle of a distribution of all travel times for that travel time segment during that

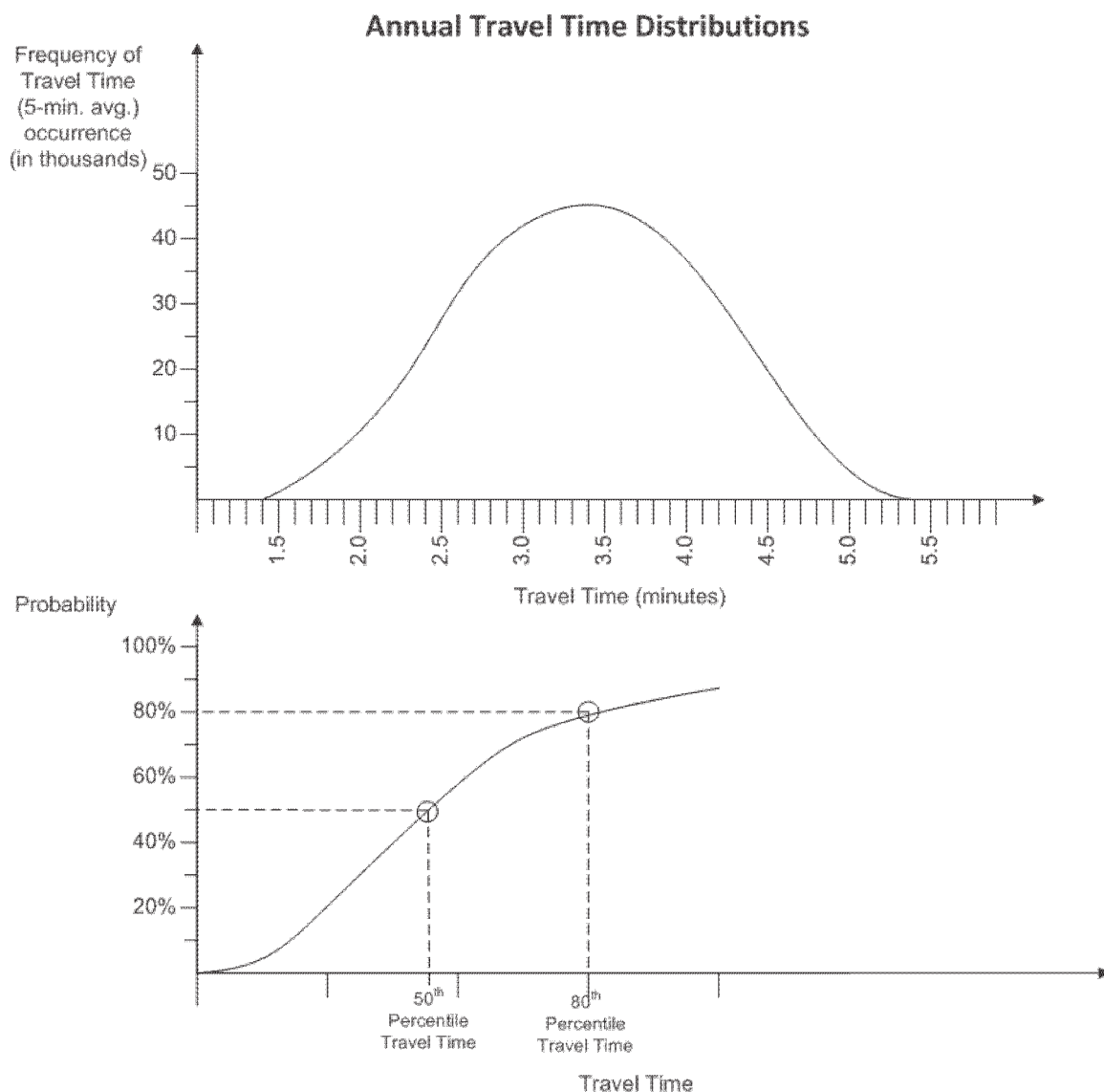
time period over a 1-year reporting period. The FHWA selected the 50th percentile as “normal travel” because it represents the “normal” experiences of travelers, rather than free flow travel (which would typically be a lower percentile, such as the 20th).

The FHWA is proposing to define *Peak Hour Travel Time* as the hour that contains the longest annual average travel time during the peak period of each non-holiday weekday. The peak period is made up of the hours of the day where the most people typically commute, or the hours with the highest amount of travel and include: Morning (6:00 a.m. to 7:00 a.m.; 7:00 a.m. to 8:00 a.m.; and 8:00 a.m. to 9:00 a.m.) and afternoon (4:00 p.m. to 5:00 p.m.; 5:00 p.m. to 6:00 p.m.; and 6:00 p.m. to 7:00 p.m.). This definition is needed as the peak period would be used as the time frame to develop the Peak Hour Travel Time Ratio metric.

The FHWA is proposing to define *Peak Hour Travel Time Ratio* as the ratio between the longest peak hour travel time and the Desired Peak Period Travel Time. The closer the ratio is to 1.0, the more the actual peak hour travel time reflects the desired peak period travel time.

A *Travel Time Cumulative Probability Distribution* is the approach State DOTs and MPOs would use to determine

percentiles needed for the travel time reliability measure. A travel time cumulative probability distribution is a representation of all the travel times for a road segment during a defined reporting period (such as annually) presented in a percentile ranked order (see Table 11 below for an example). In a graphic representation, as shown in the lower graph in Figure 8, the x-axis is the span of travel times (from shortest to longest) and the y-axis is the probability that a travel time will occur at or slower than the travel time on the x-axis. The upper graph in Figure 8 shows the travel time distribution, with travel time on the x-axis and the number of occurrences over a year on the y-axis. In a graphic representation of a cumulative probability distribution, the variability in travel time is indicated by the difference between the upper and lower bounds of travel times on a given travel time segment. For purposes of this subpart, FHWA is proposing that the upper and lower bounds be identified as the 80th and 50th percentile travel times respectively, as illustrated in the lower graph in Figure 8. Travel time variability will reduce as the difference between the upper and lower bounds decreases or as the slope of the cumulative probability distribution curve increases.



**Figure 8 – An Example of Annual Travel Time Distributions: Frequency of Travel Times vs. Cumulative Probability of Each Travel Time for a Segment**

**TABLE 11—EXAMPLE TRAVEL TIME DISTRIBUTION SHOWING PERCENTILES**

Example travel time distribution		
Rank (shortest to longest)	Travel time on road segment (seconds)	Percentiles
1 .....	20	
2 .....	20	
3 .....	20	
4 .....	21	
5 .....	21	
6 .....	22	
7 .....	22	
8 .....	22	
9 .....	22	
10 .....	23	
11 .....	24	
12 .....	24	
13 .....	24	
14 .....	25	

**TABLE 11—EXAMPLE TRAVEL TIME DISTRIBUTION SHOWING PERCENTILES—Continued**

Example travel time distribution		
Rank (shortest to longest)	Travel time on road segment (seconds)	Percentiles
15 .....	27	
16 .....	27	
17 .....	29	
18 .....	33	
19 .....	40	
20 .....	44	

50th

Please note that Table 11 is a simple illustration of obtaining 50th and 80th percentile values in a hypothetical dataset with 20 travel time entries. Within Table 11, the 50th percentile is

calculated by multiplying the total number of travel time entries (20) by 0.5 resulting in “10.” So the tenth entry in the table would be the 50th percentile travel time (23 seconds). The same approach would be used with the 80th percentile calculation: 20 travel time entries  $\times 0.8 = 16$  so the 16th entry is the 80th percentile travel time (27 seconds). Please see section 490.511 for the specifics on the proposed metrics for Travel Time Reliability and Peak Hour Travel Time measures.

Discussion of Section 490.507 National Performance Management Measures To Assess Performance of the NHS

The FHWA is proposing in section 490.507 the establishment of four measures to be used to assess the



performance of the Interstate System and non-Interstate NHS. The first two measures, which are focused on travel time reliability, are applicable to all NHS roadways in the State. The next two measures, focused on peak hour travel time, are applicable to all NHS roadways within urbanized areas with a population greater than 1 million. A total of four measures are proposed:

- Travel Time Reliability:
  - Percent of the Interstate System providing for Reliable travel times
  - Percent of the non-Interstate NHS providing for Reliable travel times
- Peak Hour Travel Time:
  - Percent of the Interstate System in large urbanized areas over 1 million in population where peak hour travel times meet expectations
  - Percent of the non-Interstate NHS in large urbanized areas over 1 million in population where peak hour travel times meet expectations.

State DOTs and MPOs would need to establish targets for each of these measures in accordance with section 490.105. These measures would be calculated using the metrics proposed in section 490.511 following the methods proposed in section 490.513. The data to support the measures are proposed in section 490.509. The proposed travel time reliability measures are designed to be used by State DOTs and MPOs to better understand the scope of reliability problems on their highway systems and to aid in identifying and implementing strategies to improve system performance. These measures are intended to quantify the variability in travel times experienced by users of the highway system during hours of the day when the predominant travel occurs on the system. In general, the variability captured by the proposed measures would be a comparison of some of the longer travel times experienced by users compared to the amount of time users typically expect their travel to take. This comparison is an indication of how reliable the highway system is, in terms of how close actual travel times are to what is expected by users.

Based on research the FHWA has been doing for the past several years, it believes that measuring the reliability of travel times is a key to operating the system more efficiently and reliably.<sup>91</sup>

<sup>91</sup> Urban Congestion Report Program ([http://www.ops.fhwa.dot.gov/perf\\_measurement/ucr/index.htm](http://www.ops.fhwa.dot.gov/perf_measurement/ucr/index.htm)) Urban Congestion Trend and "Traffic Congestion and Reliability" reports ([http://www.ops.fhwa.dot.gov/perf\\_measurement/reliability\\_reports.htm](http://www.ops.fhwa.dot.gov/perf_measurement/reliability_reports.htm)) Travel Time Reliability Overview Brochure and Guidance Document ([http://www.ops.fhwa.dot.gov/perf\\_measurement/reliability\\_measures/index.htm](http://www.ops.fhwa.dot.gov/perf_measurement/reliability_measures/index.htm)) SHRP 2 Reliability Program (esp. L03) Lessons Learned: Monitoring Highway Congestion and Reliability Using

The FHWA also heard from a wide range of stakeholders that travel time reliability is important and should be considered in this rulemaking. In addition, many stakeholders expressed a desire for a reliability measure to capture longer than normal travel times that would occur as a result of non-recurring congestion, such as traffic incidents, work zones, and special events, which can be managed by operating agencies through improved traffic flow.

The proposed peak hour travel time measures are designed to be used by State DOTs and MPOs in urbanized areas over 1 million in population to better understand the scope of undesirable congestion problems in these large urbanized areas and to identify and implement strategies to improve system performance in these areas. The measures are designed to compare the longest average time of travel experienced by users during peak hours of the day to the travel time desired for the system. The FHWA is proposing in section 490.511(c)(1) that the State DOT, in coordination with MPOs, establish a desired time of travel for sections of their highway system that would be consistent with its intended use and design. The proposed measure would represent the percentage of the applicable highway network where actual travel times experienced during peak hours meets the expectations of the State DOT and MPOs. The FHWA is proposing that peak hour travel times that meet expectations would be those conditions where actual travel times are less than 50 percent greater than what is desired for the highway.

The FHWA heard concerns from many stakeholders regarding the effectiveness of the establishment of measures that would utilize an absolute speed or travel time as a reference to assess NHS performance. Many felt that some portions of the new expanded NHS highway network may be functioning as intended even when traffic is not flowing freely. Considering this, FHWA is proposing an approach where State DOTs, in coordination with MPOs, would establish Desired Peak Period Travel Times (as times that are desired for the reporting segment) to be used as the basis for the peak hour measures. The Desired Peak Hour Period Travel Time would reflect the policies and management approach for the urbanized areas. In addition, as discussed in section 490.105(e)(8),

Archived Traffic Detector Data ([http://www.ops.fhwa.dot.gov/publications/lessons\\_learned/index.htm](http://www.ops.fhwa.dot.gov/publications/lessons_learned/index.htm)) Monitoring Urban Freeways in 2003 (<http://d2dtl5nnlpr0r.cloudfront.net/tti.tamu.edu/documents/FHWA-HOP-05-018.pdf>).

FHWA is proposing that the peak hour travel time measures would only be applicable to NHS highways in urbanized areas where populations are greater than 1 million. For these measures, one single target would be established and reported for each applicable urbanized area, where collectively all State DOTs and MPOs in these areas would need to agree on the single target even where the urbanized area intersects with multiple jurisdictional boundaries. In total, based on the 2010 U.S. Census, 42 targets would be established nationwide using this measure—one for each urbanized area where populations are greater than 1 million. This approach is being proposed so that State DOTs and MPOs can work collectively to address highway performance problems that cross geographic boundaries and impact the ability to improve system performance throughout the urbanized area.

#### Discussion of Section 490.509 Data Requirements

The FHWA is proposing for State DOTs and MPOs to use a travel time data set that would meet the requirements discussed in section 490.103 of this rulemaking to calculate the metrics defined in section 490.511. State DOTs and MPOs would use the same travel time data set to assess the performance of the directional mainline highways of the NHS.

The FHWA is proposing State DOTs, in coordination with MPOs, establish and submit reporting segments as discussed in section 490.103 of this rulemaking. These reporting segments would be used as the basis for calculating and reporting metrics to the FHWA and for State DOTs and MPOs to calculate the measures proposed in this subpart to assess Interstate System and non-Interstate NHS performance. Reporting segments, as defined in 490.101, include one or more travel time segments and must be contiguous so that they cover the full extent of the mainline highways of the NHS in the State. The section 490.103 discussion included in this rulemaking provides more information on the proposal for State DOTs to define and submit reporting segments.

The FHWA is proposing in this section that State DOTs would use the posted speed limits of roadways to estimate travel times for calculating the Reliability metrics when the data is missing or represented as a time of "0" or null in the Travel Time Data Set. The proposed use of the posted speed data is discussed in section 490.511. The FHWA is not proposing that posted

speed limit data be reported as part of this rulemaking.

The areas that would be applicable to the Peak Hour Travel Time measure would be identified when the State DOT Baseline Performance Period Report is due to FHWA, based on the urbanized area boundaries at that time. These areas would continue to be applicable to the measure (or conversely “not applicable”) for the duration of the performance period regardless of population changes that may occur during the performance period. The FHWA is proposing that the applicability of the area be determined using the most recent U.S. Decennial Census reports on area populations. At the time of this rulemaking, the Peak Hour Travel Time measure would be applicable to 42 urbanized areas in the United States.

#### Discussion of Section 490.511 Calculation of System Performance Metrics

The FHWA is proposing that two metrics need to be calculated to develop the Travel Time Reliability and Peak Hour Travel Time measures proposed in this rulemaking. They are the LOTTR metric and the Peak Hour Travel Time Ratio (PHTTR) metric. State DOTs would be required to calculate these metrics for all applicable roadway segments for the applicable time periods and report them to FHWA annually. The proposed approach to calculate and report these metrics is discussed in this section.

As proposed in section 490.511(b), the LOTTR metric would be calculated annually by the State DOT for all reporting segments on the NHS in the State and used by FHWA, State DOTs, and MPOs to assess the performance of the system. The source of data would be the Travel Time Data Set. The FHWA is proposing that 5 minute travel time bins that do not have data reported, or are reported as null, or “0” in the Travel Time Data Set would be replaced with a calculation of the travel time needed to fully traverse the travel time segment while traveling at the posted speed limit. This will ensure that a complete set of travel times for the time periods throughout the day needed to calculate the LOTTR metric are utilized. The FHWA believes that, in order to calculate an accurate assessment of

reliability, travel times throughout the day are necessary to capture the variability of travel times on the system. The FHWA is proposing that in cases where travel times are not recorded, typically due to a lack of probe sources, it is assumed that vehicles are travelling at the posted speed limit. The FHWA believes that this assumption is valid since a lack of vehicles present during a 5 minute interval on a roadway segment generally indicates uncongested conditions. The FHWA believes that as technologies improve and the percentage of vehicles containing equipment capable of communicating with vehicle probes increases, the potential for missing data will decrease over time. Considering the possibility for travel times to be missing during different time intervals of the day and the need for a complete data set to accurately calculate the reliability metric, FHWA encourages comments from the public on this proposed approach and/or alternative approaches that could be used reliably as part of a national performance program.

The FHWA is proposing that the LOTTR metric is based on the variability of travel times over a full year during following time periods: Weekdays 6:00 a.m. to 10:00 a.m.; 10:00 a.m. to 4:00 p.m.; 4:00 to 8:00 p.m.; and weekend days 6:00 a.m. to 8:00 p.m. The FHWA selected these time periods to cover peak hours and other times of day the system may be used the most. It is FHWA’s desire to have the Travel Time Reliability metric reflect the level of consistency in travel times during hours of the day when the majority of highway use occurs. In addition, by using these smaller time periods, State DOTs and MPOs may better understand reliability issues during varying travel periods throughout the week (*i.e.*, peak periods, weekday mid-day, and weekends) and implement effective operational strategies. Evaluating the defined time periods would remove the times of day when travel is typically uncongested due to the lack of vehicle use. The proposed time periods for the LOTTR metric covers 14 hours of each day resulting in 168 average travel time values for each reporting segment (stored in each 5 minute bin), either directly measured from probes or using the calculated travel time at posted speed limit as discussed above. The

FHWA is proposing that the LOTTR metric be based on a full calendar year of data which would require the analysis of up to 61,488 travel time values for each reporting segment.<sup>92</sup> Analyzing this volume of data for each reporting segment will be simpler for the State DOTs and MPOs if they use an automated spreadsheet or other software product that features a “percentile” function. This function can be used to generate the 50th percentile or “normal time” (a shorter travel time) and the 80th percentile travel time (a longer travel time) that are being proposed to calculate the metric. The FHWA is proposing the use of the 80th percentile travel time because it is generally accepted as the upper bound of travel times that transportation agencies can plausibly manage using available resources; travel times beyond this point are acknowledged to occur during unique traffic incidents that are outside the control of a transportation agency.<sup>93</sup> The FHWA is proposing the use of the 50th percentile travel time to represent the “normal” or expected time of travel during hours of the day when the highway is predominantly used.

The FHWA reviewed other options for the denominator in the LOTTR metric and determined that the 50th percentile, more so than either the 20th percentile or average travel time, more accurately reflected the expected time. Use of the 50th percentile, along with the 80th percentile, travel time, shows the variability in travel times that operational strategies can positively affect in helping to improve travel time reliability.

In general, the proposed calculation is made by ranking, from the shortest travel time to the longest, all the travel time values in each reporting segment for each time period (weekdays 6 a.m. to 10 a.m.; 10 a.m. to 4 p.m.; and 4 p.m. to 8 p.m. and weekends 6 a.m. to 8 p.m.) every day from January 1st through December 31st and identifying the 50th and 80th percentile travel times in this series for each time period. An example is contained in Table 11. The FHWA is proposing that the LOTTR metric would be calculated by developing a ratio that compares the 80th percentile travel time to the normal (50th percentile) travel time as shown in the following equation.

<sup>92</sup> Estimate based on multiplying 168 travel time values per day by 366 days in the longest year that could occur.

<sup>93</sup> SHRP 2 Project L03: [http://onlinepubs.trb.org/onlinepubs/shrp2/SHRP2\\_S2-L03-RR-1.pdf](http://onlinepubs.trb.org/onlinepubs/shrp2/SHRP2_S2-L03-RR-1.pdf).

$$\text{LOTTR} = \frac{\text{80th percentile travel time}}{\text{50th percentile "normal travel time"}}$$

The resulting LOTTR metrics (one for each time period) would be rounded to the nearest hundredth decimal place and calculated for every NHS reporting segment within the State. The LOTTR values for each of the four time periods would be reported for the relevant reporting segment. The FHWA believes that the comparison of the 80th and 50th percentiles of the travel times occurring during the time periods identified, the most typical travel times, will reflect the reliability of the system as perceived by most highway users. The FHWA encourages comments from the public on the use of time periods to develop the LOTTR metric, as well as the number and length of the time periods proposed.

In section 490.511(c), FHWA is proposing that the PHTTR metric would be calculated by State DOTs for all NHS mileage within urbanized areas with a population over 1 million using average peak hour travel times derived from the Travel Time Data Set. The proposed metric is a comparison of the longest average hourly travel time, referred to in this rulemaking as the “peak hour travel time,” to the travel time desired by the State DOT and MPO for the reporting segment. The FHWA is not proposing to address missing data for this metric as:

- The metric is focused on travel occurring during only peak hours of the day when it may not be correct to assume free flowing conditions when data are missing; and
  - the metric is computed using hourly average travel times that can be determined even if there are missing 5 minute travel time bins within the one hour time period.
- The FHWA also proposes that, for this metric, any 5 minute bin travel times that represent travel speeds below 2 mph or above 100 mph be excluded from the metric calculation to remove outliers that may negatively affect the metric. The FHWA encourages comments on these approaches and invites suggestions on alternatives that could be considered that may be more effective.

In this rulemaking, FHWA is proposing that the peak period of travel will occur between 6:00 a.m. and 9:00 a.m. or between 4:00 p.m. and 7:00 p.m. on non-holiday weekdays. The six 1-hour time blocks within these periods are referred to as the “peak period” in this rulemaking. The FHWA proposes a 2-step process of determining the peak hour of travel time for calculating the PHTTR metric for a reporting segment. As the first step, the annual average travel time for each of the six hourly

blocks in the peak period (6:00 a.m. to 7:00 a.m.; 7:00 a.m. to 8:00 a.m.; 8:00 a.m. to 9:00 a.m.; 4:00 p.m. to 5:00 p.m.; 5:00 p.m. to 6:00 p.m.; and 6:00 p.m. to 7:00 p.m.) would be calculated separately for a reporting segment. For calculating those six annual averages, measured travel times on non-holiday weekdays over a full calendar year would be used. As the second step, the highest numeric value, or longest time, of the annual average travel time among the hours in the peak period would be selected as the peak hour travel time for calculating the PHTTR metric for the reporting segment and that hour would be referred to as the “peak hour” for metric and measure development purposes. For example, if annual average peak hour travel times across a reporting segment were as follows: 6:00 a.m. to 7:00 a.m.: 125 seconds; 7:00 a.m. to 8:00 a.m.: 196 seconds; 8:00 a.m. to 9:00 a.m.: 120 seconds; 4:00 p.m. to 5:00 p.m.: 105 seconds; 5:00 p.m. to 6:00 p.m.: 105 seconds; 6:00 p.m. to 7:00 p.m.: 108 seconds, then the 7:00 a.m. to 8:00 a.m. period with an average annual hourly travel time of 196 seconds would be selected as the peak hour and used to calculate the PHTTR.

This proposed process is illustrated in the equation below:

$$\text{Peak Hour Travel Time} = \text{Max}_{i=1}^{i=6} \left\{ \left( \frac{\sum_{j=1}^T \sum_{k=1}^{12} \text{Travel Time}_{k,j,i}}{T \times 12} \right) \right\}$$

Where:

- Max = longest average travel time of the six peak hours
- i = “peak hours” (each hour between 6:00 a.m. to 9:00 a.m. and 4:00 p.m. to 7:00 p.m.)
- j = day of the year
- T = total number of days in the year
- k = 5 minute bin
- $\text{Travel Time}_{k,j,i}$  = vehicle travel time, to the nearest second, for the reporting segment recorded or estimated during 5 minute bin “k,” on day “j,” during the peak hour “i”
- Peak Hour Travel Time = the highest recorded annual average travel time, to the nearest second, occurring throughout the year during the “peak hours.”

The FHWA is proposing that State DOTs, in coordination with MPOs, establish Desired Peak Period Travel

Times for each reporting segment, based on their operational policies for NHS roadways. The FHWA recommends that these Desired Peak Period Travel Times also be developed in consultation with operating agencies. For each reporting segment, State DOTs would need to report a single “Desired Peak Period Travel Time” for the morning hours in the peak period and a single “Desired Peak Period Travel Time” for the afternoon hours in the peak period when reporting segments are submitted to FHWA as proposed in section 490.103(f). As proposed, State DOTs would only be allowed to modify the Desired Peak Period Travel Time if the reporting segment lengths change during a performance period. The

FHWA anticipates that State DOTs will work with MPOs, in consultation with applicable operating agencies, to develop policies (*i.e.*, desired travel at posted speed limits) that would determine how the desired level would be established. Under this proposed approach, FHWA does not plan to approve or judge the Desired Peak Period Travel time levels or the policies that will lead to the establishment of these levels.

The FHWA is proposing that the PHTTR ratio is a comparison of the Peak Hour Travel Time to the Desired Peak Period Travel Time for each reporting segment and calculated as illustrated in the following equation:



$$\text{PHTTR} = \frac{\text{Peak Hour Travel Time}}{\text{Desired Peak Period Travel Time}}$$

Where:

- Peak Hour Travel Time = the longest recorded average annual travel time, to the nearest second, occurring throughout the year during the “peak hour;”
- Desired Peak Period Travel Time = the desired travel time, to the nearest second, in the peak period, either morning or afternoon, that corresponds to the hour in which the Peak Hour Travel Time occurred;
- PHTTR = Peak Hour Travel Time Ratio for the reporting segment to the nearest hundredth.

In section 490.511(d), FHWA is proposing for State DOTs to report annually the LOTTR and PHTTR metrics for each applicable reporting segment on the NHS. State DOTs would report these metrics in HPMS no later than June 15th of the following year (*i.e.*, metrics for calendar year 2017 would be reported no later than June 15, 2018). Specifically, FHWA is proposing that State DOTs would report annually the following to the HPMS for each reporting segment:

- NPMRDS TMC codes (or related reporting segments made up of multiple

Travel Time Segments) or standard HPMS location referencing;

- LOTTR metrics for each of the four time periods, to the nearest hundredth;
- 80th percentile, travel times for each of the four time periods to the nearest second;
- 50th percentile, travel times for each of the four time periods to the nearest second;
- PHTTR metric, to the nearest hundredth;
- Peak Hour Travel Time, to the nearest second; and
- the Hour (6 a.m., 7 a.m., 8 a.m., 4 p.m., 5 p.m., or 6 p.m.)

The FHWA intends to issue additional guidance on how State DOTs could report these data to HPMS. The FHWA recognizes the burden associated with the efforts needed to conflate (or relate) travel time reporting segments (NPMRDS data locations) to locations on a defined roadway network (State GIS-based locations). For this reason, FHWA is not proposing a requirement for State DOTs to conflate the travel time reporting segments to the HPMS roadway network. The FHWA intends to conduct this conflation.

Discussion of Section 490.513  
Calculation of System Performance Measures

The FHWA is proposing section 490.513 to establish a method that can be used by State DOTs, MPOs, and FHWA to calculate the performance measures proposed in section 490.507. These system performance measures are based on the performance metrics proposed in section 490.511 Calculation of System Performance Metric(s). The FHWA expects that State DOTs and MPOs will use the methods proposed in this section to assess and report on the performance of the system. The FHWA proposes to use this calculation method to report on performance at a national level and to carry out its evaluation of the progress made by State DOTs to achieve their NHPP targets.

The proposed calculation method would be used to determine the percentage of the system, by length, operating at a specified level of performance. The general format for this calculation is illustrated in the equation below:

$$\text{Measure} = 100 \times \frac{\sum_{i=1}^R SL_i}{\sum_{i=1}^T SL_i}$$

Where:

- $i$  = reporting segment
- $R$  = total number of reporting segments operating at a specified performance level, as defined through a threshold proposed for each metric
- $T$  = total number of reporting segments in the system and area applicable to the measure
- $SL_i$  = length of the reporting segment, to the nearest thousandth of a mile
- Measure = the percentage of the system operating at a specified performance level (operating below the metric threshold).

The FHWA is proposing the level that represents reliable travel to highway users is a LOTTR of 1.50. This LOTTR level represents an operating level where 80 percent of the travel times observed on a roadway segment is less than 50 percent more than what is observed normally (defined as the 50th percentile travel time for this rulemaking). The LOTTR is a ratio, so a 1.0 would mean that the 80th and 50th percentile travel times were the same. A 1.50 or above LOTTR means that the 80th percentile travel time is 50 percent

longer than the 50th percentile travel time and represents less than acceptable travel time reliability. In general, this operating level of reliability represents conditions where the amount of time to travel on an NHS highway is up to 50 percent longer than what users would have expected. The FHWA also considered a threshold of 2.0, or twice the normal travel time, but determined that these travel times would be longer than most system users would consider reliable. The FHWA ultimately chose the 1.5 threshold understanding that there will be some variability in travel time that may be beyond the ability of operating agencies to affect. While any LOTTR above 1.00 would indicate some variability in travel time, it is the variability that is 50 percent more than the normal time that is being addressed with this measure and that has the ability to be addressed through operational and other strategy implementation. The FHWA encourages comments from the public on the proposed LOTTR threshold level of 1.50

and if it is at the appropriate level to indicate unreliable performance.

The FHWA is proposing that a PHTTR threshold level of 1.50 represents peak hour travel times that meet expectations of State DOTs, MPOs, and local operating agencies. This PHTTR level represents a condition where observed (or estimated) travel times in large urbanized areas are no more than 50 percent higher than what would be desired for the roadway, as identified by the State DOT and MPO. The PHTTR is a ratio where 1.0 would mean that the actual peak hour travel time would equal to the Desired Peak Period Travel Time. So a PHTTR of 1.5 represents an actual peak hour travel time that is 50 percent higher than the Desired Peak Period Travel Time. The FHWA feels that a PHTTR level of 1.50 or higher indicates a roadway is no longer meeting its intended purpose, as desired by local needs, to move traffic through the system. The FHWA encourages comments from the public on the proposed PHTTR threshold level of 1.50 and if it is at the appropriate level to

indicate that peak hour travel time performance meets expectations.

Both of these measures use the same threshold—1.50. The FHWA believes that highway users and operating agencies begin to consider the system to not meet expectations when trips take 50 percent longer than what they would normally expect. For example, highway users would become frustrated with the system when a trip that is expected to

take 30 minutes ends up taking 45 minutes or longer.

For the reliability measure, FHWA evaluated the impact of different threshold values ranging from 1.2 to 2.0 on reliability of the Interstate System in five States that varied in size and population. This evaluation showed minimal sensitivity to changes in reliability when the reliability threshold was above 1.6 and a sharp drop off in reliability when the threshold was

below 1.3. The FHWA's proposed threshold value of 1.50 resulted in reliability levels that appeared to be reasonable as a level that could be used to manage performance.

A summary of the criteria described previously for the proposed performance measures, including the measure, the metric, and transportation network or geographic area the measure would apply to, is provided in Table 12 below:

TABLE 12—SUMMARY OF PROPOSED PERFORMANCE MEASURE CRITERIA

Measure	Metric & threshold	Applicable transportation network/geographic area
490.507(a)(1): Percent of the Interstate System providing for reliable travel times (calculation proposed in 490.513(b)).	LOTTR < 1.50	• Interstate System.
490.507(a)(2): Percent of the non-Interstate NHS providing for reliable travel times (calculation proposed in 490.513(c)).	LOTTR < 1.50	• Non-Interstate NHS.
490.507(b)(1): Percent of the Interstate System where peak hour travel times meet expectations (calculation proposed in 490.513(d)).	PHTTR < 1.50	• Interstate System in each urbanized area † with a population >1 M.
490.507(b)(2): Percent of the non-Interstate NHS where peak hour travel times meet expectations (calculation proposed in 490.513(e)).	PHTTR < 1.50	• Non-Interstate NHS in each urbanized area † with a population >1 M.

† One measure would be calculated for each urbanized area, including those urbanized areas that intersect with multiple State and metropolitan planning area boundaries.

### 3. Subpart F: National Performance Management Measures To Assess Freight Movement on the Interstate System

In this sub-section, FHWA describes the proposed requirements in Subpart F, which would establish performance measures to assess freight movement on the Interstate System. The discussions of the proposed requirements are organized as follows:

- Section 490.601 discusses the purpose of the subpart;
- Section 490.603 describes the applicability of the subpart;
- Section 490.605 presents the definitions;
- Section 490.607 discusses the performance measures;
- Section 490.609 describes the data requirements;
- Section 490.611 identifies how to calculate performance metrics; and,
- Section 490.613 presents how to calculate performance measures.

#### Discussion of Section 490.601 Purpose

The FHWA is required, under 23 U.S.C. 150(c), to establish performance measures for State DOTs to use to assess the performance of freight movement on the Interstate System. The FHWA proposes to establish in this subpart a travel time reliability measure and a congestion measure for State DOTs and MPOs to use to assess freight movement on the Interstate System.

#### Discussion of Section 490.603 Applicability

As required by 23 U.S.C. 150(c)(6), FHWA proposes that the freight performance measures will apply to freight movement on the Interstate System.

#### Discussion of Section 490.605 Definitions

The FHWA proposes to define *Normal Travel Time* for freight performance in the same manner as defined for system performance in section 490.603 as the time expected of Interstate System roadway users to travel when the system is predominantly in use. This time is proposed to be defined as the 50th percentile travel time occurring during this period of use. The 50th percentile relates to the travel time that occurs in the middle of a distribution of all travel times for that travel time segment over a 1-year reporting period. The FHWA selected the 50th percentile as “normal travel” because it is the mid-point of all reported travel time and is more likely to provide an accurate estimate of the typical travel time that best serves as the travel time, or denominator, by which to compare the highest travel times. The 50th percentile was chosen to represent the *Normal Travel Time* because it has been used in previous FHWA performance measure research and analysis to represent a speed at which a vehicle is traveling without impediments or congestion. This

previous FHWA research and analyses confirmed that this is an appropriate threshold. The FHWA considered other options, including the 20th percentile and average speed. After analysis of these options, the 50th percentile compared to the 95th percentile appeared to provide the most meaningful representation of delay for the purpose of this rule.

#### Discussion of Section 490.607 National Performance Management Measures To Assess Freight Movement on the Interstate System

Slow or unreliable truck travel times are a cause of diminished productivity for drivers and equipment; they reduce the efficiency of operations, increase the cost of goods, increase fuel costs, and reduce drivers' available hours for service. Considering these potential impacts and the input received from public and private sector freight stakeholders, FHWA is proposing measures in this subpart that would focus on both the speed of truck travel and the time reliability for truck travel. The FHWA identifies these measures as complimentary in illustrating congestion and performance of the Interstate System. The FHWA believes that State DOTs and MPOs, by using both of these measures, can assess and evaluate areas where freight-movement problems are occurring on the Interstate System by looking at the entire Interstate System within their boundaries, as well as specific isolated areas where delays typically occur. The

two measures proposed are: (1) Percent of the Interstate System providing for Reliable Truck Travel Times; and (2) Percent of the Interstate System Uncongested.

The first proposed measure (Percent of the Interstate System providing for Reliable Truck Travel Times) is based on the concept of using a metric that is an index to assess the “extra budgeted time” needed to assure an on-time arrival. This concept, used by many transportation operating agencies today to assess and manage system operations, considers the variability in operating travel times as an indicator of trip time planning needs. In general, highways that are operating with higher travel time variability would require extra time to be budgeted to assure an on-time arrival of trips. This metric can be used as a management tool to identify the strategies that, when implemented effectively, would minimize the need for travelers to have to budget “extra time” into their trip planning.

The efficient use of resources to move goods across the country is particularly critical for freight operations on the Interstate System. For this reason, the reliability measure proposed in this subpart is designed to support freight trip planning needs where a high level of certainty is needed to assure on time arrivals for trips occurring at all hours throughout the year. Shippers, carriers, and receivers desire on-time or just-in-time delivery of goods and plan their trips by building in enough time to be on time. To do this, they consider the longest travel times of a route by looking at the distribution of travel times, which equates to the 95th percentile or higher. They typically budget their trip time at the 95th percentile travel time level. This assures their customers that aside from an extreme traffic event, they will be on time. However, the freight industry will consider the reliability ratio of the worst travel times to normal travel times in route planning and desire for there to be a low ratio meaning that there is little difference between the normal travel time and the worst travel times. They will reroute or consider other shipping options for routes with extreme congestion or high reliability ratios. To be consistent with the industry measures of reliability, FHWA proposes to use the 95th percentile travel time in comparison to the 50th percentile travel time as the normal travel time. As a threshold, FHWA proposes that the reliability ratio be below 1.5. This means that the trips take no more than 50 percent longer than normal. The FHWA believes that the freight industry would not find trips that are longer than 50 percent above

normal reliable. The FHWA seeks comments on this assumption.

The FHWA selected this ratio based on information it has received from stakeholders as well as its own research. As discussed with relation to section 490.513 (the performance of the NHS measures), FHWA believes that shippers and suppliers begin to consider the system to not meet expectations when trips take 50 percent longer than what they would normally expect.

The truck travel time reliability measure proposed in this subpart differs from the travel time reliability measure proposed in Subpart E (for performance of the Interstate and non-Interstate NHS) of this rulemaking in that the truck travel time reliability is focused on the variability in travel times experienced by trucks during all hours of the day and throughout the year. In contrast, the travel time reliability measure proposed in Subpart E is focused on the variability in travel times experienced by all vehicles that typically occur due to non-recurring events during the times of the day when the highway facility is in predominant use. The second proposed measure (Percent of the Interstate System Mileage Uncongested) uses average truck speeds to determine the percentage of Interstate System mileage that is considered uncongested. This measure is being proposed to assess where delays are occurring on the Interstate System so that strategies to address these locations can be implemented to improve the efficiency of freight movement. This measure differs from the reliability measure in that it is focused on shortening travel times where the reliability measure is focused on improving the consistency of travel times.

The congestion measure proposed in this subpart differs from the traffic congestion measure proposed in Subpart G (Annual Hours of Excessive Delay per Capita) of this rulemaking in that the speed threshold to identify the presence of congestion for freight movement is higher than the threshold used to define traffic congestion. In addition, the freight congestion measure broadly applies to all Interstate System roadways across the country where the traffic congestion measure is focused only on NHS roadways in the largest urbanized areas in the country. Both sets of measures are based on speed. The freight measures use speed to identify congested segments, while the traffic congestion measure uses speed to calculate the additional travel time caused by “excessive” delay.

The criteria used to establish the two proposed measures in this subpart are derived from research and testing of

data by FHWA using the FPM. The FHWA produced two reports illustrating the use of Travel Time Reliability and Average Truck Speed measures to validate the proposed thresholds.<sup>94</sup> These reports provided insight into how well the measures described the travel conditions on the Interstate System confirming that the thresholds are appropriate for the measures.

#### Discussion of Section 490.609 Data Requirements

The FHWA is proposing that State DOTs use a travel time data set that would meet the requirements discussed in section 490.103 of this rulemaking to calculate the metrics defined in section 490.611. State DOTs and MPOs would use the same travel time data set to assess freight movement on the Interstate System.

The FHWA is proposing that State DOTs establish and submit reporting segments as discussed in section 490.103 of this rulemaking. These reporting segments would be used as the basis for calculating and reporting metrics to FHWA, and for their use and MPO use to calculate measures proposed in this subpart to assess freight movement. Reporting segments, as defined in section 490.101, include one or more travel time segments and must be contiguous so that they cover the full extent of the mainline highways of the Interstate System in the State. The section 490.103 discussion included in this rulemaking provides more information on the proposal for State DOTs to define and submit reporting segments.

The FHWA is proposing in this section that in cases where the travel time required to calculate a metric is missing or represented as a time of “0” or null in the Travel Time Data Set, State DOTs would be required to use an observed travel time that represents all traffic on the roadway during the same 5 minute interval (referred to as “all vehicles” in the NPMRDS) provided this travel time is representative of travel speeds less than the posted speed. In all other cases, FHWA is proposing that State DOTs use a travel time that would have occurred while traveling at the posted speed limit to replace missing travel times or those that are represented as a time of “0” or null in the Travel Time Data Set. The proposed use of the “all traffic” and posted speed

<sup>94</sup> FHWA 2006, Travel Time Reliability: Making It There On Time, All the Time. [http://ops.fhwa.dot.gov/publications/tt\\_reliability/](http://ops.fhwa.dot.gov/publications/tt_reliability/); FHWA 2006, Freight Performance Measure: Travel Time in Freight-Significant Corridors. [http://ops.fhwa.dot.gov/freight/freight\\_analysis/perform\\_meas/fpmtraveltime/traveltimebrochure.pdf](http://ops.fhwa.dot.gov/freight/freight_analysis/perform_meas/fpmtraveltime/traveltimebrochure.pdf).



data is discussed in section 490.611. As discussed previously, FHWA is not proposing that posted speed limit data be reported as part of this rulemaking.

#### Discussion of Section 490.611 Calculation of Freight Movement Metrics

In section 490.611, FHWA proposes the methodologies for calculating Truck Travel Time Reliability and Average Truck Speed metrics. The FHWA is proposing the same method to calculate the truck travel time reliability metric as discussed for the LOTTR metric

discussed in Subpart E of this rulemaking with the exception of the days/times and the travel time percentile used in the calculation. As discussed previously in Subpart E, this method would require State DOTs to assemble and organize a complete year of travel time data for each reporting segment to calculate the metric. The FHWA is proposing in section 490.611(b), that the assembled data would include, for each reporting segment, average truck travel times, to the nearest second, for 5 minute periods of the day, or 5-minute bins. The

information in those 5-minute bins would be collected throughout the day, for every hour of every day from January 1st through December 31st of the same year. In cases where the 5-minute bins for travel time segments are:

- Missing from the dataset or include truck travel times reported as “0” or null; and
- do not include all traffic travel times representative of speeds less than the posted speed limit; then
- a truck travel time would be used that represents travel at the posted speed limit (TTT@PSL)

$$TTT@PSL(seconds) = \frac{\text{Segment Length (miles)}}{\text{Posted Speed Limit (miles per hour)}} \times 60 \times 60$$

In section 490.611(b), to calculate the Truck Travel Time Reliability the FHWA is proposing that State DOTs would determine from the assembled data set described above the 95th percentile travel time and the 50th percentile travel time. The basis for the 95th percentile travel time is that it represents more certainty of on-time arrival for freight stakeholders. The 50th percentile was chosen, as previously described, based on an analysis of reliability measurement and how it compares to using the 20th percentile or average. The FHWA analyzed travel times for several regions in the Nation with different population characteristics and found that the 50th percentile provided the most accurate picture of reliability.

The metric would be determined by dividing the 95th percentile travel time by the 50th percentile travel time for each reporting segment. The FHWA believes that the 95th percentile travel time will represent the longest trip, excluding extreme outliers, that likely occurred on the reporting segment throughout the year and the 50th percentile travel time will typically represent the normal time experienced during the year. Therefore, the proposed metric will be an indication of the variability considering nearly all travel times that had occurred throughout the year. The FHWA is proposing this approach so that the Truck Travel Time Reliability metric would be an indicator of the planning time needed to assure a high level of confidence in on-time arrival of freight movements that could occur all hours of the day throughout the year. The FHWA is seeking comment specifically on the appropriateness of the proposed percentiles used in this metric

calculation to assess reliability of truck travel times on the Interstate System.

In section 490.611(c), to calculate the Average Truck Speed metric for each reporting segment, truck travel speeds would be derived from the data in the travel time data set. Within that data set, for any 5-minute bins that are missing from the dataset, are missing data, or where data is reported as “0” or null, those bins would be replaced with the “all traffic” travel time value where the travel time correlates with speeds that are less than posted speed limit. In all other cases, it would be replaced with a travel time (TTT@PSL) that would represent the time to traverse the travel time segment at the posted speed limit.

Because the data set provides average travel times by Travel Time Segment and in 5-minute bins (or 5-minute periods), Average Truck Speed for a reporting segment would need to be calculated for the entire calendar year. Average truck travel time would be calculated by dividing the Travel Time Segment length by the truck travel time for each reporting segment for each 5-minute bin throughout the calendar year. Then, the result of this calculation for each of the 5-minute bins would be added together. This sum would be divided by the total number of 5-minute bins in a calendar year. This calculation would be done for each of the reporting segments.

In section 490.611(d), FHWA is proposing for State DOTs to report, on an annual frequency, the Truck Travel Time Reliability and Average Truck Speed metrics for each reporting segment on the Interstate System. State DOTs would report the annual outcomes to the HPMS by June 15th of the following year (*i.e.*, metrics for calendar year 2017 would be reported no later than June 15, 2018).

Specifically, FHWA is proposing that State DOTs would report annually the following to the HPMS for each reporting segment:

- Reference NPMRDS TMC codes (or related reporting segments made up of multiple TMC codes) or standard HPMS location referencing;
- Truck Travel Time Reliability metric, to the nearest hundredth;
- 95th percentile travel time to the nearest second;
- 50th percentile travel time to the nearest second; and
- Average Truck Speed metric, to the nearest hundredth mile per hour.

The FHWA intends to issue additional guidance on how State DOTs could report these data to HPMS. The FHWA recognizes the level of effort needed to conflate travel time reporting segments to align them with a referenced highway network for the system performance and freight measures. For this reason, FHWA is not proposing a requirement for State DOTs to conflate the travel time reporting segments to the HPMS roadway network. The FHWA intends to conduct this conflation, if needed, if State DOTs choose to report the metrics by Travel Time Segment codes.

#### Discussion of Section 490.613 Calculation of Freight Movement Measures

In sections 490.613(a) and (b), FHWA proposes the method to calculate the measures to assess freight movement on the Interstate System proposed in section 490.607. This method would be used by State DOTs and MPOs to assess freight performance when reporting and establishing targets. The FHWA would also use this to report on freight performance at a national level. The two measures would be calculated using the

annual metrics reported for reporting segments.

The proposed calculation method would be used to determine the percentage of the system, by length, operating at a specified level of performance for each of the two measures. The general format for this calculation is illustrated in the equation below:

$$\text{Measure} = 100 \times \frac{\sum_{i=1}^R SL_i}{\sum_{i=1}^T SL_i}$$

Where:

- i = reporting segment
- R = total number of reporting segments operating at a specified performance level, as defined through a threshold proposed for each metric
- T = total number of reporting segments on the Interstate System in the State
- $SL_i$  = length of the reporting segment, to the nearest thousandth of a mile
- Measure = the percentage of the system operating at a specified performance level (operating above the metric threshold).

The specific criteria proposed to calculate each of the measures following the format discussed above is proposed as follows:

- Truck Travel Time Reliability metric threshold < 1.50
- Average Truck Speed  $\geq$  50.00 mph.

The truck travel time reliability threshold of 1.50 is proposed to be the level at which truck travel times become unreliable. This level represents a condition where travel time could be no more than 50 percent longer than what would be expected during normal travel time conditions. Reliability levels greater than 1.50 are considered in this rulemaking to be unreliable due to the impact of the additional time that freight operators would need to consider and provide for during trip planning to assure on-time arrival. Reliability levels greater than 1.50 generally mean a trip could take twice as long as it would at the 50th percentile or normal travel time. This would not occur on every trip, but on the worst days. The FHWA also considered a threshold of 2.0, or twice the normal travel time, but determined that these travel times would be longer than most users would consider reliable. The FHWA ultimately chose the 1.5 threshold understanding that there will be some variability in travel time that may be beyond the ability of operating agencies to affect.

The average truck speed of 50.00 mph is proposed to be the level at which delay would exist on Interstate System highways when speeds are below this value as posted speed limits on Interstate System highways are typically

55 mph or greater. The FHWA is considering any travel speeds occurring below 50.00 mph to be representative of “congested” conditions for freight flow. The FHWA is seeking comment on the appropriateness of this speed threshold to indicate congested conditions.

#### 4. Subpart G: National Performance Management Measures To Assess the Congestion Mitigation and Air Quality Improvement Program—Traffic Congestion

In this section, FHWA describes the proposed changes to Subpart G, which would establish a performance measure for assessing traffic congestion. The discussions of the proposed requirements are organized as follows:

- Section 490.701 discusses the purpose of the subpart;
- Section 490.703 describes the applicability of the subpart;
- Section 490.705 presents the definitions;
- Section 490.707 discusses the performance measure;
- Section 490.709 describes the data requirements;
- Section 490.711 identifies how to calculate performance metric; and,
- Section 490.713 presents how to calculate performance measure.

##### Discussion of Section 490.701 Purpose

The FHWA is required, under 23 U.S.C. 150(c), to establish performance measures for State DOTs to use to assess traffic congestion for the purpose of carrying out the CMAQ program. The FHWA proposes to establish in this subpart an excessive delay measure for State DOTs and MPOs to use to assess traffic congestion.

##### Discussion of Section 490.703 Applicability

The FHWA proposes that the measure apply only to those portions of the NHS in urbanized areas with a population over 1 million that contain areas designated as nonattainment or maintenance areas for the  $O_3$ , CO, or PM ( $PM_{10}$  and  $PM_{2.5}$ ) NAAQS under the CAA Amendments of 1990.

The FHWA felt that the CMAQ Traffic Congestion measure should apply to nonattainment/maintenance areas and should relate to how the CMAQ program currently operates. Given the burden of developing multiple measures, FHWA chose to limit this measure to urbanized areas over 1 million in population, as agencies in these areas typically have more capability and experience in developing this type of measure than agencies outside of these areas. In addition, MPOs in these areas are expected to be

the same MPOs that are required to report on this measure as part of the CMAQ performance plan requirements in 23 U.S.C. 149(l).

Many traffic congestion reduction projects that seek CMAQ funding use a form of a delay measure to show the benefits of traffic reduction (as well as emission reductions). This, in part, led FHWA to focus on a delay measure for the CMAQ Traffic Congestion measure, so that existing and future projects would use similar measures for analysis as the proposed national measure.

By establishing where and when the worst delay occurs on the NHS facilities in large urbanized areas where air quality is a concern, State DOTs and MPOs can better plan investments that address excessive delays and emissions reduction.

##### Discussion of Section 490.705 Definitions

The FHWA proposes to define “Excessive Delay” as the traffic speed that causes delays that would be perceived by users as being excessive (*i.e.*, delay that is significantly greater than normal and, therefore, an indication of the most congested conditions). The FHWA is proposing that “excessive delay” occurs on Interstates, freeways,<sup>95</sup> or expressways<sup>95</sup> when traffic slows to below 35 mph, and on other principal arterials<sup>95</sup> and all other roads included on the NHS when traffic slows to below 15 mph. These speed thresholds were chosen to represent “excessive” delay.

##### Discussion of Section 490.707 National Performance Management Measures for CMAQ Program—Traffic Congestion

In section 490.707, FHWA proposes the measure of Annual Hours of Excessive Delay Per Capita, which would be used by State DOTs, MPOs, and FHWA to assess traffic congestion performance of large urbanized areas that contain nonattainment or maintenance areas for any of the criteria pollutants under the CMAQ program. The FHWA is proposing that this measure be used to establish a single target and report on traffic congestion performance for each applicable urbanized area, including those that intersect with multiple State and metropolitan planning area boundaries. This measure is being proposed because it addresses the impact of transportation projects funded under the CMAQ

<sup>95</sup> Highway Functional Classification Concepts, Criteria and Procedures (2013 Edition): [http://www.fhwa.dot.gov/planning/processes/statewide/related/highway\\_functional\\_classifications/fcauab.pdf](http://www.fhwa.dot.gov/planning/processes/statewide/related/highway_functional_classifications/fcauab.pdf).

program, which are often designed to create both emissions and congestion benefits. Incidentally, the proposed measure would also capture the impacts of transportation projects funded via other sources that aid in reducing congestion in areas applicable to this measure. Use of an excessive delay measure relates to the widespread use of delay-related metrics to justify congestion-related CMAQ projects, an important consideration when looking at what projects will help meet targets established under 23 U.S.C. 150(d) and 23 U.S.C. 134(h)(2).

In order to capture the total delay over a full year, FHWA is proposing in this subpart to use vehicle counts as a method to expand the sampling of highway average travel times to all traffic using the system. The FHWA elected to propose the use of vehicle counts as this is the most accurate and widely available information on nationwide use of the system. Including vehicle counts in the measure helps ensure the measure reflects, as closely as possible from available data, the actual amount of vehicles delayed. If FHWA proposed a measure that did not include vehicle counts, the same length of delay on a high volume road would count the same as the same length of delay on a low volume road.

As discussed in the Performance Measure Analysis section of this rulemaking, DOT considered alternatives to a highway based traffic congestion measure that would reflect the delays experienced by all travelers using all modes of surface transportation but, for the reasons discussed in this rulemaking, elected to propose only a highway based measure as a first step. After careful consideration, FHWA determined that it would be too burdensome at this time to propose requirements for State DOTs and MPOs to gather and process the data necessary to calculate measures that would be representative of travelers using all surface transportation modes. Although technologies are improving and information on system use is more available, FHWA believes that the current state of practice is not yet mature enough to propose requirements to measure, in a reliable and consistent manner, more than highway delay. Considering the current state, FHWA is proposing a measurement approach that would focus on excessive delay experienced by motor vehicles on the highway system. The FHWA is proposing that this measure is expressed as a ratio of the total excessive highway delay experienced by all traffic to the population of the applicable area. This will provide a more meaningful measure

as delay is related to a typical person's experience in traveling in the urbanized area. The FHWA recognizes that other options for making the Annual Vehicle Hours of Excessive Delay understandable to the public besides dividing by urban area population may exist. The FHWA encourages comments on using "per capita" or other options.

The FHWA and DOT would like to move to a measure in the future that could be used to assess traffic congestion in a manner that reflects the experience of all travelers using the various modes of surface transportation that are available in an urbanized area. For the purpose of this rulemaking, FHWA considers any expansion of the proposed approach to be a "future" measure of traffic congestion where such a measure could additionally capture the congestion as experienced by travelers that are using other modes such as: Transit, commuter railways, walkways, and bikeways. The DOT is taking steps now to work with State DOTs, MPOs, and other surface transportation stakeholders to study and advance the technologies that could be used to move the current state of practice to capture the necessary data to support a "future" measure.

The FHWA encourages public comment on the following issues related to the measure approach and methods that can be used to realize a "future" measure of traffic congestion.

- Are there existing methods that can be used reliably to weigh the highway delay metric by "total vehicle occupants" rather than "total number of vehicles"? Are there technologies or methods that could be advanced in the next 3–5 years to capture vehicle occupancy data?
- Which surface modes of transportation, other than highways, have readily available data that could be used to support a measure to assess traffic congestion? To what extent is this information available in the urbanized areas applicable to the measure proposed in this subpart?
- What would be the appropriate surface transportation network to use to measure traffic congestion in the future? Is data available off the NHS that can be used to assess traffic congestion that can be made available to all State DOTs and MPOs?

#### Discussion of Section 490.709 Data Requirements

The FHWA is proposing for State DOTs and MPOs to use a travel time data set that would meet the requirements discussed in section 490.103 of this rulemaking to calculate the metrics defined in section 490.711.

State DOTs and MPOs would use the same travel time data set to assess traffic congestion for all applicable directional mainline highways on the NHS.

In section 490.709(b), FHWA is proposing for State DOTs to establish and submit reporting segments, in coordination with MPOs on the segments within metropolitan planning areas, as discussed in section 490.103 of this rulemaking. These reporting segments would be used as the basis for calculating and reporting metrics to FHWA and for calculating measures proposed in this subpart to assess traffic congestion. Reporting segments, as defined in 490.101, include one or more travel time segments, and would be contiguous so they cover the full extent of the mainline highways of the NHS in the State. The section 490.103 discussion included in this rulemaking provides more information on the proposal for State DOTs to define and submit reporting segments.

To calculate the measure, State DOTs also would need to provide estimates of hourly traffic volume that can be applied to some or all portions of the NHS in areas applicable to this measure. Traffic volumes would be needed to estimate the accumulated delay experienced by all users of the highway system. The FHWA is proposing in section 490.709(c) that State DOTs could use one of the two methods proposed in section 490.709(c)(1) to count or estimate hourly traffic volumes for each reporting segment. Examples of standard approaches to estimate hourly traffic include using AADT with k-factors or traffic profiles. The hourly traffic volumes do not have to be submitted to FHWA, but State DOTs would need to report to FHWA the method they used to estimate traffic volumes. State DOTs would need to report the method they use to FHWA no later than 60 days prior to the submittal of the first Baseline Performance Period Report. The FHWA recognizes State DOTs subsequently may change the method they used to estimate traffic volumes. Thus, FHWA proposes in section 490.709(c)(4) that if a State DOT elects to change the submitted methodology, then the State DOT would submit the changed methodology no later than 60 days prior to the submittal of next State Biennial Performance Report required in section 490.107(b).

The population of the applicable area is needed to calculate the proposed traffic congestion measure. The FHWA is proposing in section 490.709(d) that the most recently available U.S. Decennial Census population data available at the time when the State DOT Baseline Performance Period



Report is due to FHWA would be used for the entire performance period. Census-defined urbanized areas could change between the Decennial Census and could be adjusted on varying schedules. Consequently, the population in those changed or adjusted urbanized areas may change as well. The FHWA recognizes that if an urbanized area boundary is changed after the target is established by the State DOT for urbanized areas, then actual measured performance within the changed urbanized area boundary would represent a different transportation network and population as compared to what was used to establish the target. This difference could impact a State DOT's ability to make significant progress for targets. Thus, for calculating the traffic congestion measure, FHWA proposes that State DOTs and MPOs would use the latest Decennial Census population of urbanized areas available at the time when the State DOT Baseline Performance Period Reports are due to FHWA, regardless of subsequent boundary adjustment or natural population changes. This means that the population numbers used in the calculation of the traffic congestion measure would remain constant for the duration of a performance period.

Similarly, urbanized areas that contain nonattainment or maintenance areas would be based on the designation status at the time the State DOT Baseline Performance Period Report is due to FHWA, and that designation status would be used for the entire performance period.

The geographic areas that would be applicable to this measure would be identified in the State DOT Baseline Performance Period Report submitted to FHWA. These areas would continue to be applicable to the measure (or conversely remain "not applicable") for the duration of the performance period regardless of changes to designation, urbanized areas, or populations that may occur during the performance period. The FHWA is proposing that the applicability of the area be determined using the most recent U.S. Decennial Census reports on area populations; the urbanized areas approved by FHWA and submitted in HPMS at the start of a performance period; and the EPA nonattainment or maintenance designations for the O<sub>3</sub>, CO, and PM NAAQS. At the time of this rulemaking, 36 urbanized areas in the U.S. would be applicable to this measure.

#### Discussion of Section 490.711 Calculation of Congestion Metric

The FHWA is proposing in this section for State DOTs to calculate the Total Excessive Delay for each reporting segment and report these metrics to FHWA annually.

Section 490.711(b) contains the specific data that is required to calculate the metric and is described in more detail in the discussion of section 490.709(b). The use of the data is explained in the proposed calculation methodology.

The FHWA is proposing in section 490.711(c) through (e) the method to calculate the Total Excessive Delay as discussed below.

*Excessive Delay Threshold Travel Time*—The FHWA is proposing in section 490.711(c) the establishment of two threshold travel speeds that would be used to indicate when operating conditions have deteriorated to the point that excessive travel time delays would occur. Any measured travel speeds below the threshold would represent the operating condition level that would result in excessive delays. These thresholds are proposed to be:

- 35 mph for Interstates, freeways, or expressways, and
- 15 mph for all other NHS roadways.

The FHWA defines congestion on the agency Traffic Congestion Reliability reporting Web site<sup>96</sup> as "*an excess of vehicles on a roadway at a particular time resulting in speeds that are slower—sometimes much slower—than normal or free flow speeds. (Congestion is) stop-and-go traffic.*" The Urban Congestion Report, a quarterly publication produced for FHWA, uses a speed threshold of 45 mph to define congested travel on Interstates and other highways, in a number of urban areas across the country. Operating speeds that are below a "free flow" speed will generate some level of delay and therefore could be seen by travelers as a congested condition. The FHWA decided when establishing the proposed traffic congestion measure to assess when delays are excessively impacting travel, so that the worst congestion would be accounted for and, hopefully, addressed. By accounting for the worst congestion, FHWA believes that the proposed approach could help reduce overall traffic congestion. For this reason, FHWA selected proposed thresholds of 35 mph on Interstate and other highways to express excessive (rather than just congested conditions at 45 mph), and 15 mph on principle

arterials and all other roadways on the NHS to identify excessive delay when speed limits can be as low as 25 mph on these roads. The threshold for Interstates and other highways is below the threshold FHWA uses to define congested travel in the Urban Congestion Report. However, FHWA believes that the proposed thresholds represent operating speeds that would excessively impact travel times. The FHWA encourages public comment on these proposed thresholds and invites alternative approaches to define the threshold at which excessive delay would occur.

The Excessive Delay Threshold Travel Time would be determined by the State DOT for each travel time segment to represent the time that it could take for a vehicle to traverse the reporting segment before excessive delay would occur. This time threshold would be determined by dividing the travel time segment length by the excessive delay threshold speed corresponding to the roadway functional level (35 mph or 15 mph) and converting the quotient to a time unit of seconds. For example, if a travel time segment on an Interstate is 1/2 mile in length, then the Excessive Delay Threshold Travel Time for that segment would be the travel time at 35 mph. The calculation would be Segment length (.5 mile) divided by threshold speed (35 mph) which equals .0142 hours, or 51.4 seconds.

*Excessive Delay*—The FHWA is proposing in section 490.711(d) the method to determine the amount of excessive delay occurring during each 5-minute interval for a Travel Time Segment within the travel time data set for which travel times were recorded. The excessive delay would be determined by comparing the recorded average travel time<sup>97</sup> from the 5-minute bin to the Excessive Delay Threshold Travel Time for the corresponding Travel Time Segment discussed in the previous paragraph. The excessive delay would need to be determined for every 5-minute interval for every hour and every day during a calendar year. The methodology proposed in the regulation identifies an arithmetic difference between the measured and an Excessive Delay Threshold Travel Time for each 5-minute bin for individual reporting segment as the travel time segment delay or the reporting segment delay (RSD).

The RSD, as calculated above, would result in a positive or negative amount

<sup>96</sup> Traffic Congestion Reliability, [http://www.ops.fhwa.dot.gov/perf\\_measurement/index.htm](http://www.ops.fhwa.dot.gov/perf_measurement/index.htm).

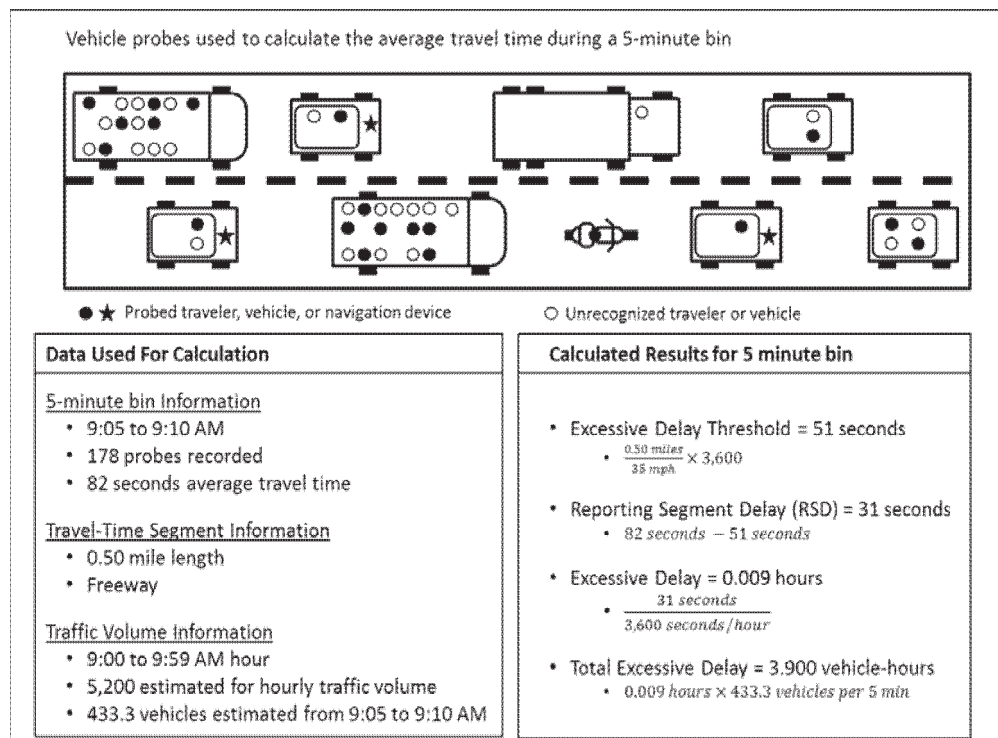
<sup>97</sup> The NMPRDS provides a recorded average travel time (in seconds) from the 5-minute bin for Travel Time Segment that is an average travel time of all the probes that traveled through that Travel Time Segment during a 5-minute interval.

of time. Any positive RSD values would be considered the additional amount of time, during the corresponding 5-minute time interval, each user of the roadway would have needed to traverse the Travel Time Segment as compared to traveling at the threshold speed. Any negative RSD times would represent 5-minute times in which travel is not excessively delayed. These negative RSD values would change to “0” seconds. Any positive RSD values that are calculated to be above 5 minutes would be capped at 5 minutes to prevent excessive delay from being counted twice. The excessive delay for the travel time segment would be determined by converting the RSD values (0 or greater than 0) to a unit of “hours,” by dividing the RSD by 3,600 seconds/hour.

**Total Excessive Delay**—The FHWA is proposing in section 490.711(e) the method State DOTs would use to calculate the excessive delay metric for each reporting segment where this value represents the accumulated amount of additional time, in hours, that were experienced by all traffic throughout a full calendar year as a result of being excessively delayed. The metric would be calculated by first multiplying (1) the Excessive Delay values for a particular 5-minute bin by (2) the estimated traffic volume for a recorded 5-minute interval (which would be based on the hourly volume for the hour that corresponds to the 5-minute interval). That calculation would be done for every 5-minute bin of every day for the entire calendar year. Then, the product of those calculations would be added up for a reporting segment to produce the metric—Total

Excessive Delay (in vehicle hours), an annual metric. This proposed calculation method would be based only on recorded travel times in the travel time data set as FHWA is assuming in this rulemaking that any missing or null travel time values would be occurring when travel times are consistent with free flow speeds. The FHWA believes that this assumption is valid as missing or null values would likely occur when very few or no vehicles are using the roadway.

The FHWA is proposing for State DOTs to use estimated hourly traffic volumes to expand the travel times, determined by probing a sample of highway users, to represent the total excessive delay experienced by roadway users. An example of this proposed method is provided in Figure 9 below:



**Figure 9: Example-Total Excessive Delay**

In this example, 178 highway probes were recorded (from mobile phones, vehicles, or portable navigation devices) during a 5-minute period of time which, on average, took 82 seconds to traverse a 0.50 mile long roadway segment located on a freeway. These highway users were experiencing excessive delay as the threshold time for this roadway segment is 51 seconds. For this example, the additional time experienced by each highway user as a

result of being excessively delayed is estimated to be 0.009 hours. This delay per highway user is expanded to represent all traffic by multiplying the delay per user, 0.009 hours, by the estimated traffic volume during the 5 minute interval, 433.3 vehicles. The product of 3.900 vehicle-hours is the Total Excessive Delay for the 5 minute interval. The final metric for this example would then carry out this same process for every 5 minute interval

through a full calendar year and for each travel time segment within the reporting segment.

The FHWA recognizes that the proposed method would apply a delay per highway user to total vehicles to identify the total excessive delay of vehicles. The FHWA elected to use this approach as it is believed that traffic volume data are the most accurate and complete data available on the use of the highways. As previously discussed,

the FHWA desires to move to a future measure that would account for all travelers and encourages public comment as to how and when this can be accomplished in a reliable and accurate manner at a national level.

The FHWA is proposing section 490.711(f) that would require State DOTs to report annually on the Total Excessive Delay (as measured in vehicle-hours) metric for each applicable reporting segment on the NHS. State DOTs would report the annual outcomes to the HPMS by June 15th of the following year (*i.e.*, metrics for calendar year 2017 would be reported no later than June 15, 2018). Specifically, FHWA is proposing that State DOTs would report annually the following to the HPMS for each reporting segment:

- NPMRDS TMC codes or standard HPMS location referencing; and
- Total Excessive Delay metric, to the nearest one hundredth hours.

The FHWA intends to issue additional guidance on how State DOTs could report these data to HPMS. As discussed previously with respect to proposed sections 490.511 and 490.611, FHWA recognizes the level of effort to conflate travel time reporting segments to align with a referenced highway network. For this reason, FHWA is not proposing a requirement for State DOTs to conflate the travel time reporting segments to the HPMS roadway network. The FHWA intends to conduct this conflation, if needed, if State DOTs choose to report the metric by Travel Time Segment reference codes.

#### Discussion of Section 490.713 Calculation of Congestion Measure

The FHWA is proposing the method to be used by State DOTs and MPOs to calculate the traffic congestion measure, Annual Hours of Excessive Delay Per Capita, proposed in section 490.707. The FHWA, State DOTs, and MPOs would all use this method to assess performance, establish targets, and/or report on performance. The measure would be calculated by summing the Total Excessive Delay, calculated as proposed in section 490.711, of all reporting segments in the applicable area and then dividing this total by the population for the applicable area. As discussed in section 490.703, this measure is calculated for each urbanized area with a population over 1 million that contain nonattainment or maintenance areas for any of the criteria pollutants covered under the CMAQ program. A single measure would be determined for urbanized areas that intersect with multiple State and metropolitan planning area boundaries

and for each applicable area within a State boundary. For example, in the State of Maryland, based on the 2010 U.S. Decennial Census and areas designated nonattainment or maintenance at the time of this rulemaking for O<sub>3</sub>, CO, and/or PM; there are three TMAs that are applicable to this measure including Philadelphia, Baltimore, and Washington DC. In this case, for Maryland, the State DOTs and MPOs with NHS mainline highways in these TMAs would need to calculate three identical measures for the entire area, and report associated targets: One for the Baltimore area, and one each for the Philadelphia area and the Washington DC area.

#### 5. Subpart H: National Performance Management Measures for the Congestion Mitigation and Air Quality Improvement Program—On-Road Mobile Source Emissions

In this section, FHWA describes the proposed changes to Subpart H, which would establish a performance measure for assessing on-road mobile source emissions. The discussion of the proposed requirements is as follows:

- Section 490.801 discusses the purpose of the subpart;
- Section 490.803 describes the applicability of the subpart;
- Section 490.805 presents the definitions;
- Section 490.807 discusses the performance measure;
- Section 490.809 describes the data requirements;
- Section 490.811 identifies how to calculate performance metric;
- Section 490.813 presents how to calculate performance measure.

#### Discussion of Section 490.801 Purpose

The FHWA is required, under 23 U.S.C. 150(c), to establish performance measures for State DOTs to assess on-road mobile source emissions for the purpose of carrying out the CMAQ program. The FHWA proposes to establish in this subpart a measure for State DOTs and MPOs to use to assess the reduction of the criteria pollutants and applicable precursors under the CMAQ program through the programming of projects.

#### Discussion of Section 490.803 Applicability

In section 490.803(a), FHWA proposes that the on-road mobile source emissions performance measure would be applicable to State DOTs and MPOs that received funding from the CMAQ program that contain areas designated as nonattainment or maintenance for the O<sub>3</sub>, CO, or PM (PM<sub>10</sub> and PM<sub>2.5</sub>) NAAQS

under the Clean Air Act Amendments of 1990.

Similar to the traffic congestion measure, for this measure MPOs serving urbanized areas over 1 million in population with nonattainment and maintenance areas have additional performance reporting requirements (See 23 U.S.C. 149(l)). Because of the special emphasis for these areas, FHWA proposes that these areas would be subject to the full set of performance requirements. The FHWA anticipates that MPOs serving in these areas over 1 million in population with nonattainment or maintenance areas could calculate and use the proposed performance measure to assess on-road mobile source emissions in their applicable planning area as these organizations have more experience and capability to manage their air quality program through the transportation conformity process and the implementation of the CMAQ program, including estimating emissions reductions and reporting to the CMAQ Public Access System.<sup>98</sup> Accordingly, FHWA's proposal includes some additional requirements for the MPOs serving larger urbanized areas that are described in more detail throughout this NPRM. For nonattainment and maintenance areas defined in section 490.803(a) with a population below this threshold, even though they are not subject to the additional CMAQ performance plan reporting requirements, FHWA proposes that the measure would apply in these areas, but with more flexibility. The FHWA believes that since all O<sub>3</sub>, CO, or PM nonattainment and maintenance areas, regardless of size, are eligible to receive CMAQ funds and all CMAQ-funded projects must demonstrate an emissions reduction, then the measure should apply to all areas. The FHWA believes that planning organizations serving smaller urbanized areas, including "donut areas" (as defined in 40 CFR 93.101) could either calculate and use the performance measure or support the State DOT and rely on it to calculate and use the performance measure to assess on-road mobile source emissions. State DOTs would also calculate and use the measure in "isolated rural nonattainment and maintenance areas," as defined in 40 CFR 93.101.

In section 490.803(b), FHWA proposes that State DOTs and MPOs that do not contain any O<sub>3</sub>, CO, PM<sub>10</sub>, and PM<sub>2.5</sub> nonattainment or maintenance areas would not be required to calculate and report on on-

<sup>98</sup> CMAQ Performance Plan as required by 23 U.S.C. 149(l).



road mobile source emission performance as these State DOTs and MPOs are allowed for flexibility in spending their CMAQ funds whereby projects are not required to adhere to specific CMAQ eligibility requirements can be funded by CMAQ.

#### Discussion of Section 490.805 Definitions

The FHWA proposes definitions associated with the on-road mobile source emissions performance measures that are used in the proposed regulation. It includes definitions for Donut Areas, Isolated Rural Nonattainment and Maintenance Areas, and On-Road Mobile Source.

The FHWA proposes to utilize the same definition for donut area and isolated rural nonattainment and maintenance areas, as found in the transportation conformity rule at 40 CFR 93.101. The FHWA proposes to define on-road mobile sources as emissions from vehicles that you would typically expect to find on our roadways, such as cars, trucks, and buses.<sup>99</sup>

#### Discussion of Section 490.807 National Performance Management Measures for CMAQ Program: On-Road Mobile Source Emissions

In section 490.807, FHWA proposes the measure of “Total Emissions Reduction” to assess on-road mobile source emissions. The measure will be the 2-year and 4-year cumulative reported emissions reduction resulting from CMAQ projects, by applicable criteria pollutants (O<sub>3</sub>, CO, PM<sub>10</sub>, and PM<sub>2.5</sub>) and applicable precursors (*e.g.*, VOC and NO<sub>x</sub> are precursors for O<sub>3</sub> and PM) for which the area is in nonattainment or maintenance. For example, in the case of O<sub>3</sub>, a measure will need to be established for each of O<sub>3</sub>’s precursors, NO<sub>x</sub> and VOC. The FHWA would like, through this rulemaking, to establish a measure that would rely on the existing processes State DOTs are using to manage, track, and report projects as part of the CMAQ program. For this reason, FHWA elected to base the proposed measure on the estimated emission reductions reported by State DOTs for CMAQ-funded projects through the CMAQ Public Access System. As discussed in the Measure Analysis section of the rulemaking, FHWA believes that this approach provides the best opportunity to effectively implement the MAP-21 performance requirements for on-road mobile source emissions. The data and

tools to support the performance measure are readily available at a national level and are already in use today. The FHWA believes that collecting emissions data on a project-by-project basis through vehicle probing or another means would be cost prohibitive and would delay implementation because enough pre and post project completion data would not be available to accurately measure the actual reductions. The FHWA is proposing in this rulemaking to establish a measure that expresses the total emissions reduced per fiscal year, for all CMAQ-funded projects by pollutant and applicable precursors for which the area has been designated as nonattainment or maintenance. The emissions reductions would be summed for each fiscal year and cumulated by applicable pollutant and precursor to represent total reductions estimated after 2 fiscal years and after 4 fiscal years.

#### Discussion of Section 490.809 Data Requirements

The FHWA proposes to use the CMAQ Public Access System<sup>100</sup> as the data source for the measure, based on data available as of July 1 of the calendar year in which a CMAQ performance plan required in 23 U.S.C. 149(l) or State Biennial Performance Reports, required in section 490.107, is due. The CMAQ Public Access System is populated from the State DOT CMAQ annual report<sup>101</sup> which includes project information submitted through the CMAQ project tracking system.<sup>102</sup> The FHWA uses these yearly submissions through the CMAQ Public Access System to maintain a database of CMAQ investments as required by 23 U.S.C. 149(i)(1). Drawing from the information in the database, the CMAQ Public Access System provides an opportunity for the general public and project sponsors to have access to information submitted through the annual reporting process.

State DOTs report estimated emissions reductions of CMAQ projects for the first year that a project is obligated and only the first time a project is entered into the system, not each time the project receives CMAQ funds, to avoid double counting of

benefits. The quantitative emissions reduction estimates are reported for each CMAQ-funded project in kilograms (kg) per day for applicable criteria pollutants (and their precursors) for which the area is nonattainment or maintenance. These five pollutants or precursors include CO, PM<sub>2.5</sub>, PM<sub>10</sub>, nitrogen oxides (NO<sub>x</sub>), and volatile organic compound (VOC). Both NO<sub>x</sub> and VOC are potential precursors to O<sub>3</sub>, PM<sub>10</sub> and PM<sub>2.5</sub>. While no single method is specified in the CMAQ Guidance for estimating emissions, every effort should be taken to ensure that the estimates are credible and based on a reproducible and logical analytical procedure. The FHWA is working to develop a tool kit of best practices to improve the assumptions and calculations used to quantitatively estimate emissions.

For the purpose of establishing targets in section 490.105, FHWA proposes the annual reports shall include for each project, the applicable nonattainment or maintenance area and MPO for which the project is located, and quantified emissions reductions for all applicable criteria pollutants (and their precursors) for which the area is nonattainment or maintenance. For those projects that do not include a quantified emissions reduction (*i.e.*, public education and marketing), the CMAQ guidance allows for a qualitative assessment. This option is still allowed, but those projects will not be considered for the purposes of implementing the on-road mobile source emissions measure.

In 490.809(b), FHWA is proposing a period of approximately 120 days for FHWA to review and approve the data for publication in the CMAQ Public Access System. Considering this time allowance, FHWA is proposing that specific dates be established for when FHWA approves the State DOT’s annual reports and when data are available for extraction from the CMAQ Public Access System for the purpose of implementing the on-road mobile source emissions measure. These dates are necessary in order to report the measures and establish targets in a timely manner. The FHWA is proposing the following dates:

- March 1—The FHWA is proposing that State DOTs enter their project information for a given fiscal year by March 1st of the following fiscal year; and

- July 1—The FHWA is proposing that it will make available the data necessary to calculate the on-road mobile source emissions measure will be in the CMAQ Public Access System by July 1st for project obligations in the prior fiscal year.

<sup>99</sup> “What is Transportation Conformity?” training slides <https://connectdot.connectsolutions.com/whatisconformity/>.

<sup>100</sup> The Public Access System is available at: [https://fhwaapps.fhwa.dot.gov/cmaq\\_pub/HomePage/](https://fhwaapps.fhwa.dot.gov/cmaq_pub/HomePage/).

<sup>101</sup> Guidance on CMAQ annual reporting can be found in section IX. C. of the CMAQ Interim Program Guidance under MAP-21, November 12, 2013.

<sup>102</sup> Information on the CMAQ project tracking system can be found at [http://www.fhwa.dot.gov/environment/air\\_quality/cmaq/reporting/](http://www.fhwa.dot.gov/environment/air_quality/cmaq/reporting/).

In 490.809(c), FHWA is proposing to identify nonattainment or maintenance areas based on the most recent effective designations made by the EPA when the State DOT Baseline Performance Period Report is due to FHWA. The areas designated at this time will remain as the areas applicable to this subpart for the duration of the performance period. For example, for a performance period that begins on October 1, 2017, and ends on September 30, 2021, FHWA would consider the designated areas as of October 1, 2018, to be those subject to this subpart even if the effective nonattainment and maintenance area designations change during the performance period after this date.

#### Discussion of Section 490.811 Calculation of Emissions Metric

The FHWA proposes in section 490.811 the method that would be used by State DOTs and MPOs to calculate the annual emission reductions for projects reported to the CMAQ Public Access System in a Federal fiscal year. The metric would be calculated for each CMAQ-funded project and for each applicable criteria pollutant and precursor. The proposed method would convert the emissions reductions reported in the CMAQ Public Access System from units of kg per day to short tons per year: One kg per day is equal to 0.4026 short tons per year. The emissions reductions would then be summed for all projects within the applicable reporting area, by criteria pollutant or precursor, for a Federal fiscal year. The annual emissions reductions (in tons/year) would be used to calculate the performance measure proposed in section 490.813.

#### Discussion of Section 490.813 Calculation of Emissions Measure

The FHWA proposes in section 490.813 that State DOTs and MPOs should calculate on-road mobile source emissions reductions by summing the annual tons of emissions reduced by CMAQ projects, using the 2 and 4 years of available data from the Public Access System as proposed in section 490.809 by criteria pollutant or precursor. For example, for the first proposed performance period that would begin on October 1, 2017, and end on September 30, 2021. So the 2-year total emissions reductions by criteria pollutant or applicable precursor for the performance period would reflect project data from Federal fiscal years from 2018 through 2019, and the 4-year total emissions reductions by criteria pollutant or applicable precursor for the performance period would reflect

project data from Federal fiscal years from 2018 through 2021.

### VII. Rulemaking Analyses and Notices

All comments received before the close of business on the comment closing date indicated above will be considered and available for examination in the docket at the above address. Comments received after the comment closing date will be filed in the docket and considered to the extent practicable. In addition to late comments, FHWA will also continue to file relevant information in the docket as it becomes available after the comment period closing date, and interested persons should continue to examine the docket for new material. A final rule may be published at any time after close of the comment period and after FHWA has had the opportunity to review the comments submitted.

#### *A. Executive Order 12866 (Regulatory Planning and Review), Executive Order 13563 (Improving Regulation and Regulatory Review), and DOT Regulatory Policies and Procedures*

The FHWA has determined that this proposed rule constitutes a significant regulatory action within the meaning of Executive Order 12866 and is significant within the meaning of DOT regulatory policies and procedures. This action complies with Executive Orders 12866 and 13563 to improve regulation. This action is considered significant because of widespread public interest in the transformation of the Federal-aid highway program to be performance-based, although it is not economically significant within the meaning of Executive Order 12866. The FHWA is presenting a Regulatory Impact Analysis (regulatory analysis or RIA) in support of this NPRM on National Performance Measures to Assess Performance of the National Highway System, Freight Movement on the Interstate System, and Congestion Mitigation and Air Quality Improvement Program. The regulatory analysis estimates the economic impact, in terms of costs and benefits, on Federal, State, and local governments, as well as private entities regulated under this action, as required by Executive Order 12866 and Executive Order 13563. The economic impacts are measured on an incremental basis, relative to current practices.

This section of the NPRM identifies the estimated costs and benefits resulting from the proposed rule in order to inform policy makers and the public of the relative value of the current proposal. The complete RIA may be accessed from the rulemaking's docket (FHWA–2013–0054).

The cornerstone of MAP–21's highway program transformation is the transition to a performance-based program. In accordance with the law, State DOTs would invest resources in projects to achieve performance targets that make progress toward national goal areas. The MAP–21 establishes national performance goals for system reliability, freight movement and economic vitality, and environmental sustainability. The FHWA must promulgate a rule to establish performance measures to assess performance of the Interstate System and non-Interstate NHS; assess freight movement on the Interstate System, and to carry out the CMAQ program and assess traffic congestion and on-road mobile source emissions. As required by MAP–21, this NPRM identifies the following performance measures for which State DOTs and MPOs must collect and report data, establish targets for performance, and make progress toward achievement of targets:

1. Percent of the Interstate System providing for Reliable Travel Times;
2. Percent of the non-Interstate NHS providing for Reliable Travel Times;
3. Percent of the Interstate System where peak hour travel times meet expectations;
4. Percent of the non-Interstate NHS where peak hour travel times meet expectations;
5. Percent of the Interstate System Mileage providing for Reliable Truck Travel Times;
6. Percent of the Interstate System Mileage Uncongested;
7. Annual Hours of Excessive Delay Per Capita; and
8. Cumulative emissions reduction resulting from CMAQ projects by criteria pollutant for which the area is in nonattainment or maintenance.

#### Estimated Cost of the Proposed Rule

To estimate costs for the proposed rule, FHWA assessed the level of effort, expressed in labor hours and the labor categories, and capital needed to comply with each component of the proposed rule. Level of effort by labor category is monetized with loaded wage rates to estimate total costs.

Because there is some uncertainty regarding the availability of NPMRDS data for use by State DOTs and MPOs, FHWA estimated the cost of the proposed rule according to two scenarios. Under Scenario 1, FHWA assumes that it will provide State DOTs and MPOs with the required data from NPMRDS. Table 13 displays the total cost of the proposed rule for the 11-year

study period (2016–2026).<sup>103</sup> Total costs discounted at 7 percent, and \$141.6 million discounted at 3 percent.  
over 11 years are estimated to be \$165.3 million undiscounted, \$117.4 million

TABLE 13—TOTAL COST OF THE PROPOSED RULE UNDER SCENARIO 1

Cost components	11-Year total cost		
	Undiscounted	7%	3%
Section 490.103—Data Requirements .....	\$21,241,714	\$15,226,570	\$18,275,559
Intake and Process DOT Travel Time Data .....	15,918,501	11,180,489	13,578,804
NPMRDS Data Acquisition .....	4,000,000	2,809,433	3,412,081
NPRMDS Data Training .....	489,800	457,757	475,534
NPMRDS Data Reconciliation .....	833,414	778,891	809,139
Section 490.105–490.109—Reporting Requirements .....	90,529,176	63,693,723	77,239,133
Document and Submit Description of Coordination Between State DOTs and MPOs .....	2,134,912	2,134,912	2,134,912
Establish and Update Performance Targets .....	40,763,607	29,114,925	35,021,902
Prepare and Submit Initial Performance Report .....	919,236	919,236	919,236
Reporting on Performance Targets Progress .....	31,269,138	21,219,453	26,279,023
Prepare CMAQ Performance Plan .....	13,465,179	9,137,563	11,316,326
Assess Significant Progress Toward Achieving Performance Targets .....	1,933,462	1,132,171	1,528,071
Adjust HPMS to Handle Data in TMC Format and Design Post-Submission Reports .....	24,804	23,181	24,082
HPMS Data Processing (e.g., Data Verification) .....	18,838	12,282	15,581
Section 490.511—Calculation of Performance Metrics for NHS Performance .....	5,478,984	3,897,015	4,698,453
Calculate LOTTR .....	2,828,595	1,961,095	2,399,861
Estimate Desired Level of PHTTR for All Roads .....	787,736	654,465	723,310
Calculate PHTTR .....	1,862,653	1,281,455	1,575,282
Section 490.513—Calculation of Performance Measure for NHS Performance .....	4,285,750	3,111,923	3,709,859
Develop Reliability Performance Measures .....	3,084,798	2,239,901	2,670,283
Develop Travel Time Performance Measures .....	1,200,952	872,023	1,039,576
Section 490.611—Calculation of Performance Metrics for Freight Mobility .....	3,306,150	2,407,408	2,863,507
Calculate Average Truck Travel Speed: Establish Process .....	183,675	171,659	178,325
Calculate Average Truck Travel Speed: Update Average .....	1,469,400	1,032,045	1,253,428
Calculate Truck Reliability: Establish Process .....	183,675	171,659	178,325
Calculate Truck Reliability: Update Metric .....	1,469,400	1,032,045	1,253,428
Section 490.613—Calculation of Performance Measures for Freight Reliability .....	14,807,031	10,751,525	12,817,359
Develop Freight Travel Time Performance Measures .....	7,403,516	5,375,762	6,408,679
Develop Freight Reliability Performance Measures .....	7,403,516	5,375,762	6,408,679
Section 490.711—Calculation of Performance Metric for CMAQ Congestion .....	5,128,771	3,710,508	4,429,895
Calculate Excessive Delay Threshold Travel Time .....	1,282,193	927,627	1,107,474
Identify all 5-minute Bins with Travel Times above the Threshold Speed and Calculate Excessive Delay .....	1,165,630	818,690	994,306
Develop Hourly Traffic Volumes in Order to Weight Segments .....	1,515,319	1,145,502	1,333,810
Finalize Weighted Metrics for Reporting .....	1,165,630	818,690	994,306
Section 490.713—Calculation of Congestion Measure .....	6,612,300	4,801,253	5,723,782
Develop Congestion Performance Measure .....	6,612,300	4,801,253	5,723,782
Section 490.811—Calculation of Emissions Metric .....	13,285,826	9,331,408	11,333,079
Develop Emission Performance Metric for Some CMAQ Projects .....	13,285,826	9,331,408	11,333,079
Section 490.813—Calculation of Emissions Measure .....	593,412	430,882	513,673
Develop Emission Performance Measure .....	593,412	430,882	513,673
Total Cost of Proposed Rule .....	165,269,115	117,362,215	141,604,299

\* Totals may not sum due to rounding.

Under Scenario 2, which represents “worst case” conditions, State DOTs would choose to independently acquire the necessary data. Table 14 displays

the total cost of the proposed rule for the 11-year study period (2016–2026). Total costs over 11 years are estimated to be \$224.5 million undiscounted,

\$158.9 million discounted at 7 percent, and \$192.1 million discounted at 3 percent.

<sup>103</sup> In FHWA’s first two performance measure NPRMs, it assessed costs over a 10-year study period. Because FHWA is now proposing individual effective dates for each of its performance measure rules rather than a common effective date, the timing of the full implementation of the measures has shifted. Using an 11-year study

period ensures that the cost assessment includes the first 2 performance periods following the effective date of the rulemaking, which is comparable to what the 10-year study period assessed in the first two NPRMs. An 11-year study period captures the first year costs related to preparing and submitting the Initial Performance Report and a complete cycle

of the incremental costs that would be incurred by State DOTs and MPOs for assembling and reporting all required measures as a result of the proposed rule. FHWA anticipates that the recurring costs beyond this timeframe would be comparable to those estimated in the 10-year period of analysis.



TABLE 14—TOTAL COST OF THE PROPOSED RULE UNDER SCENARIO 2

Cost components	11-Year total cost		
	Undiscounted	7%	3%
Section 490.103—Data Requirements .....	\$80,425,414	\$56,794,724	\$68,760,455
Acquire Freight and General Traffic Data .....	51,000,000	35,820,266	43,504,034
Adjust Contract for Freight-only Data .....	9,000,000	6,321,223	7,677,183
Remove Estimated Data Values from Database .....	3,183,700	2,236,098	2,715,761
Intake and Process .....	15,918,501	11,180,489	13,578,804
Data Training .....	489,800	457,757	475,534
Data Reconciliation .....	833,414	778,891	809,139
Section 490.105–490.109—Reporting Requirements .....	90,529,176	63,693,723	77,239,133
Document and Submit Description of Coordination Between State DOTs and MPOs .....	2,134,912	2,134,912	2,134,912
Establish and Update Performance Targets .....	40,763,607	29,114,925	35,021,902
Prepare and Submit Initial Performance Report .....	919,236	919,236	919,236
Reporting on Performance Targets Progress .....	31,269,138	21,219,453	26,279,023
Prepare CMAQ Performance Plan .....	13,465,179	9,137,563	11,316,326
Assess Significant Progress Toward Achieving Performance Targets .....	1,933,462	1,132,171	1,528,071
Adjust HPMS to Handle Data in TMC Format and Design Post-submission Reports .....	24,804	23,181	24,082
Data Processing (e.g., Data Verification) .....	18,838	12,282	15,581
Section 490.511—Calculation of Performance Metrics for NHS Performance .....	5,478,984	3,897,015	4,698,453
Calculate LOTTR .....	2,828,595	1,961,095	2,399,861
Estimate Desired Level of PHTTR for All Roads .....	787,736	654,465	723,310
Calculate PHTTR .....	1,862,653	1,281,455	1,575,282
Section 490.513—Calculation of Performance Measure for NHS Performance .....	4,285,750	3,111,923	3,709,859
Develop Reliability Performance Measures .....	3,084,798	2,239,901	2,670,283
Develop Travel Time Performance Measures .....	1,200,952	872,023	1,039,576
Section 490.611—Calculation of Performance Metrics for Freight Mobility .....	3,306,150	2,407,408	2,863,507
Calculate Average Truck Travel Speed: Establish Process .....	183,675	171,659	178,325
Calculate Average Truck Travel Speed: Update Average .....	1,469,400	1,032,045	1,253,428
Calculate Truck Reliability: Establish Process .....	183,675	171,659	178,325
Calculate Truck Reliability: Update Metric .....	1,469,400	1,032,045	1,253,428
Section 490.613—Calculation of Performance Measures for Freight Reliability .....	14,807,031	10,751,525	12,817,359
Develop Freight Travel Time Performance Measures .....	7,403,516	5,375,762	6,408,679
Develop Freight Reliability Performance Measures .....	7,403,516	5,375,762	6,408,679
Section 490.711—Calculation of Performance Metric for CMAQ Congestion .....	5,128,771	3,710,508	4,429,895
Calculate Excessive Delay Threshold Travel Time .....	1,282,193	927,627	1,107,474
Identify All 5-minute Bins with Travel Times Above the Threshold Speed and Calculate Excessive Delay .....	1,165,630	818,690	994,306
Develop Hourly Traffic Volumes in Order to Weight Segments .....	1,515,319	1,145,502	1,333,810
Finalize Weighted Metrics for Reporting .....	1,165,630	818,690	994,306
Section 490.713—Calculation of Congestion Measure .....	6,612,300	4,801,253	5,723,782
Develop Congestion Performance Measure .....	6,612,300	4,801,253	5,723,782
Section 490.811—Calculation of Emissions Metric .....	13,285,826	9,331,408	11,333,079
Develop Emission Performance Metric for Some CMAQ Projects .....	13,285,826	9,331,408	11,333,079
Section 490.813—Calculation of Emissions Measure .....	593,412	430,882	513,673
Develop Emission Performance Measure .....	593,412	430,882	513,673
<b>Total Cost of Proposed Rule .....</b>	<b>224,452,815</b>	<b>158,930,370</b>	<b>192,089,196</b>

\* Totals may not sum due to rounding.

The costs in Tables 14 and 15 assume a portion of MPOs will establish their own targets and a portion will adopt State DOT targets. For the performance measures that apply to all State DOTs and MPOs (i.e., Travel Time Reliability and Freight Movement), it is assumed that State DOTs and MPOs serving TMAs<sup>104</sup> would use staff to establish performance targets and all other MPOs would adopt State DOT targets rather than establish their own targets and would therefore not incur any incremental costs. The FHWA made this

assumption because larger MPOs may have more resources available to develop performance targets. The FHWA believes that this is a conservative estimate as larger MPOs may elect not to establish their own targets for any variety of reasons, including resource availability.

#### Break-Even Analysis

Currently, State DOTs differ from State to State in the way they evaluate the performance of the NHS, congestion, on-road mobile source emissions, and freight movement. These differences hinder accurate analysis at the national level. The proposed rulemaking would not only establish uniform performance measures, but also would establish

processes that (1) State DOTs and MPOs use to report measures and establish performance targets and (2) FHWA uses to assess progress that State DOTs have made toward achieving targets.

Upon implementation, FHWA expects that the proposed rule would result in some significant benefits that are not easily monetized, but nonetheless deserve mention in this analysis. Specifically, the proposed rule would allow for more informed decisionmaking on congestion-, freight-, and air-quality-related project, program, and policy choices. The proposed rule also would yield greater accountability because the MAP–21-mandated reporting would increase visibility and transparency. In addition,

<sup>104</sup> A Transportation Management Area (TMA) is an urbanized area having a population of over 200,000, or otherwise requested by the Governor and the MPO and officially designated by FHWA and FTA. 23 U.S.C. 134(k).

the proposed rule would help focus the Federal-aid highway program on achieving balanced performance outcomes.

The expected benefits discussed above (*i.e.*, more informed decisionmaking, greater accountability, and the focus on making progress toward the national goal for infrastructure condition) would lead to an enhanced performance of the NHS due to reduced congestion, improved freight movement, and reduced emissions. The benefits, while real and substantial, are difficult to forecast and monetize. Therefore, FHWA addresses this issue by using the break-even analysis method suggested by OMB Circular A-4. Break-even analyses calculate the threshold a specific variable must achieve in order for benefits to equal costs while holding every other variable in the analysis constant. The FHWA performed three separate break-even analyses based on the estimated costs associated with: (1) Enhancing performance of the Interstate System and non-Interstate NHS by relieving congestion; (2) reducing emissions; and, (3) improving freight movement.

For the break-even analyses associated with enhancing the performance of the Interstate System and non-Interstate NHS, the costs associated with the following proposed rule sections are summed together to estimate the total cost of provisions aimed at reducing congestion:

- Section 490.103. Sixty percent of the cost <sup>105</sup> of obtaining data requirements;
- Section 490.105. Approximately 63 percent of the cost <sup>106</sup> of establishing performance targets;
- Section 490.107. Approximately 63 percent of the cost <sup>107</sup> of documenting and submitting a description of coordination between State DOTs and MPOs;
- Section 490.107. Approximately 63 percent of the cost <sup>108</sup> of preparing and submitting Initial Performance Reports;
- Section 490.107. Approximately 63 percent of the cost <sup>109</sup> of reporting performance targets;
- Section 490.107. Half the cost <sup>110</sup> of preparing CMAQ performance plan;
- Section 490.107. Sixty percent of the cost <sup>111</sup> of adjusting HPMS and processing data;

- Section 490.109. Cost of assessing significant progress for NHPP measures;
- Section 490.511. Cost of calculating system performance metrics;
- Section 490.513. Cost of calculating system performance measures;
- Section 490.711. Cost of calculating congestion metric; and
- Section 490.713. Cost of calculating congestion measure.

Table 15 presents the results from the break-even analysis associated with enhancing performance of the Interstate System and non-Interstate NHS under Scenario 1 (*i.e.*, FHWA provides NPMRDS data to State DOTs).

The results represent the passenger car travel time (in hours) that would need to be saved in order to justify the costs. The analysis shows that the proposed rule would need to result in approximately 354,000 hours of passenger car travel time saved per year, or 3.9 million hours over 11 years. To provide context, private commuters in 498 urban areas across the United States experience 5.5 billion hours of travel delay per year. As a result, the reduction represents a less than 0.01 percent decrease in the amount of travel delay per year for major U.S. urban areas.<sup>112</sup>

TABLE 15—BREAK-EVEN ANALYSIS OF INTERSTATE SYSTEM AND NON-INTERSTATE NHS PERFORMANCE (RELIABILITY, PEAK HOUR TRAVEL TIME, AND CONGESTION) UNDER SCENARIO 1

Undiscounted 11-year costs	Average commuter value of time (\$ per hour)	Number of hours of travel that need to be reduced	Average annual number of hours of travel that need to be reduced
a	b	c = a ÷ b	d = c ÷ 11
\$88,387,756 .....	\$22.72	3,891,103	353,737

\* Variance in the calculation is due to rounding.

\*\* Please refer to the RIA in the docket for details on the methodology used in the analysis.

Table 16 presents the results from the break-even analysis associated with enhancing performance of the Interstate System and non-Interstate NHS under Scenario 2 (*i.e.*, State DOTs independently acquire the necessary data). The results represent the

passenger car travel time (in hours) that would need to be saved in order to justify the costs. The analysis shows that the proposed rule would need to result in approximately 496,000 hours of passenger car travel time saved per year, or 5.5 million hours over 11 years.

To provide context, private commuters in 498 urban areas across the United States experience 5.5 billion hours of travel delay per year. This reduction represents a 0.01 percent decrease in the amount of travel delay per year for major U.S. urban areas.<sup>113</sup>

<sup>105</sup> Sixty percent is assumed because three of the five metrics (LOTTR, PHTTR, and Total Excessive Delay) are calculated from NPMRDS and are aimed at improving system performance and reducing congestion.

<sup>106</sup> Approximately 63 percent is assumed because five of the eight performance measures (Reliability on the Interstate System, Reliability on the non-Interstate NHS, Peak Hour Travel Time on the Interstate System, Peak Hour Travel Time on the

non-Interstate NHS, and Annual Hours of Excessive Delay Per Capita) are aimed at improving system performance and reducing congestion.

<sup>107</sup> *Ibid.*

<sup>108</sup> *Ibid.*

<sup>109</sup> *Ibid.*

<sup>110</sup> Fifty percent is assumed because one of the two CMAQ performance measures (Annual Hours of Excessive Delay Per Capita) is aimed at

improving system performance and reducing congestion.

<sup>111</sup> Sixty percent is assumed because three of the five metrics (LOTTR, PHTTR, and Total Excessive Delay) are aimed at improving system performance and reducing congestion.

<sup>112</sup> Texas Transportation Institute's (TTI) "2012 Annual Urban Mobility Report," 2013.

<sup>113</sup> TTI's "2012 Annual Urban Mobility Report," 2013.

TABLE 16—BREAK-EVEN ANALYSIS OF INTERSTATE SYSTEM AND NON-INTERSTATE NHS PERFORMANCE (RELIABILITY, PEAK HOUR TRAVEL TIME, AND CONGESTION) UNDER SCENARIO 2

Undiscounted 11-year costs  a	Average commuter value of time (\$ per hour)  b	Number of hours of travel that need to be reduced  c = a ÷ b	Average annual number of hours of travel that need to be reduced  d = c ÷ 11
\$123,897,977 .....	\$22.72	5,454,373	495,852

\* Variance in the calculation is due to rounding.

\*\* Please refer to the RIA in the docket for details on the methodology used in the analysis.

Table 187 presents the results from the break-even analysis associated with the Freight Movement on the Interstate System measures under Scenario 1 (*i.e.*, FHWA provides NPMRDS data to State DOTs and MPOs). The costs associated with the following proposed rule sections are summed together to estimate the total cost of provisions aimed at reducing freight congestion:

- Section 490.103. Forty percent of the cost <sup>114</sup> of the data requirements;
- Section 490.105. Twenty-five percent of the cost <sup>115</sup> of establishing performance targets;
- Section 490.107. Twenty-five percent of the cost <sup>116</sup> of documenting

and submitting a description of coordination between State DOTs and MPOs;

- Section 490.107. Twenty-five percent of the cost <sup>117</sup> of preparing and submitting Initial Performance Reports;
- Section 490.107. Twenty-five percent of the cost <sup>118</sup> of reporting performance targets;
- Section 490.107. Forty percent of the cost <sup>119</sup> of adjusting HPMS and processing data;
- Section 490.109. Cost of assessing significant progress for NHFP measures;
- Section 490.611. Cost of calculating freight movement metrics; and

- Section 490.613. Cost of calculating freight movement measures.

The results represent the amount of truck travel time (in hours) which would need to be saved in order to justify the costs associated with the Freight Movement on the Interstate System measures. The analysis shows that the proposed rule would need to result in approximately 168,000 hours of freight travel time saved per year, or 1.8 million hours over 11 years. This reduction represents a less than 0.1 percent decrease in the amount of freight travel delay per year for major U.S. urban areas.<sup>120</sup>

TABLE 17—BREAK-EVEN ANALYSIS OF FREIGHT PERFORMANCE (FREIGHT RELIABILITY, AVERAGE TRUCK SPEED) UNDER SCENARIO 1

Undiscounted 11-year costs  a	Average truck value of time (\$ per hour)  b	Number of hours of travel that need to be reduced  c = a ÷ b	Average annual number of hours of travel that need to be reduced  d = c ÷ 11
\$46,883,670 .....	\$25.36	1,848,481	168,044

\* Variance in the calculation is due to rounding.

\*\* Please refer to the RIA in the docket for details on the methodology used in the analysis.

Table 198 presents the results from the break-even analysis associated with the Freight Movement on the Interstate System measures under Scenario 2 (*i.e.*, State DOTs independently acquire the necessary data). The results represent the amount of truck travel time (in

hours) which would need to be saved in order to justify the costs associated with the Freight Movement on the Interstate System measures. The analysis shows that the proposed rule would need to result in approximately 253,000 hours of freight travel time saved per year, or

2.8 million hours over 11 years. This reduction represents a 0.1 percent decrease in the amount of freight travel delay per year for major U.S. urban areas.<sup>121</sup>

<sup>114</sup> Forty percent is assumed because two of the five metrics (Truck Travel Time Reliability and Average Truck Speed) calculated from NPMRDS are aimed at freight movement.

<sup>115</sup> Twenty-five percent is assumed because two of the eight performance measures (Freight Movement Reliability and Average Truck Speed) are aimed at reducing truck congestion.

<sup>116</sup> *Ibid.*

<sup>117</sup> *Ibid.*

<sup>118</sup> *Ibid.*

<sup>119</sup> Forty percent is assumed because two of the five metrics (Truck Travel Time Reliability and Average Truck Speed) calculated from NPMRDS are aimed at freight movement.

<sup>120</sup> Trucks in 498 urban areas across the U.S. experience 353.1 million hours of travel delay per year, according to the TTI's "2012 Annual Urban Mobility Report," 2013.

<sup>121</sup> Trucks in 498 urban areas across the U.S. experience 353.1 million hours of travel delay per year, according to the TTI's "2012 Annual Urban Mobility Report," 2013.



TABLE 18—BREAK-EVEN ANALYSIS OF FREIGHT PERFORMANCE (FREIGHT RELIABILITY, AVERAGE TRUCK SPEED) UNDER SCENARIO 2

Undiscounted 11-year costs	Average truck value of time (\$ per hour)	Number of hours of travel that need to be reduced	Average annual number of hours of travel that need to be reduced
a	b	c = a ÷ b	d = c ÷ 11
\$70,557,150 .....	\$25.36	2,781,855	252,896

\* Variance in the calculation is due to rounding.

\*\* Please refer to the RIA in the docket for details on the methodology used in the analysis.

Table 19 presents the results from the break-even analysis to estimate the reduction in pollutant tons<sup>122</sup> needed to be achieved in order to justify the costs associated with the Emissions performance measures. The costs associated with the following proposed rule sections are summed together to estimate the total cost of provisions aimed at reducing emissions:

- Section 490.105. Approximately 13 percent of the cost<sup>123</sup> of establishing performance targets;
- Section 490.107. Approximately 13 percent of the cost<sup>124</sup> of documenting and submitting a description of coordination between State DOTs and MPOs;

- Section 490.107. Approximately 13 percent of the cost<sup>125</sup> of preparing and submitting Initial Performance Reports;

- Section 490.107. Approximately 13 percent of the cost<sup>126</sup> of reporting performance targets;

- Section 490.107. Half the cost<sup>127</sup> of preparing CMAQ performance plan;

- Section 490.811. Cost of calculating emissions metric; and

- Section 490.813. Cost of calculating emissions measure.

The costs associated with the Emissions performance measure are identical under Scenario 1 and Scenario 2 because State DOTs would not need data from NPMRDS. Therefore, FHWA presents one set of results.

With the undiscounted cost of the on-road mobile source emissions requirements, the analysis estimates the savings in emission tons from automobiles that the proposed rule would need to save in order for the proposed rule to be cost-beneficial. The break-even analysis estimates that a total of 49,000 emission tons would need to be reduced throughout the 10-year study period, or approximately 4,000 tons annually. On a pollutant-specific basis, this is approximately equivalent to 410 tons of VOCs, 275 tons of NO<sub>x</sub>, two tons of PM<sub>2.5</sub>, and 3,730 tons of CO. These reductions represent less than 0.01 percent of the average annual pollutant emission amounts.<sup>128</sup>

TABLE 19—BREAK-EVEN ANALYSIS OF EMISSIONS (REDUCED POLLUTANTS) USING EMISSION TON METRIC

Undiscounted 11-year costs	Average emission ton cost (\$ per long ton)	Number of emissions tons needed to be reduced	Average annual number of emissions tons needed to be reduced
a	b	c = a ÷ b	d = c ÷ 11
\$29,997,688 .....	\$617.38	48,589	4,417

\* Variance in the calculation is due to rounding.

\*\* Please refer to the RIA in the docket for details on the methodology used in the analysis.

### B. Regulatory Flexibility Act

In compliance with the Regulatory Flexibility Act (Pub. L. 96–354, 5 U.S.C. 601–612), FHWA has evaluated the effects of this action on small entities and has determined that the action would not have a significant economic impact on a substantial number of small entities. The proposed amendment addresses the obligation of Federal funds to State DOTs for Federal-aid highway projects. The proposed rule

affects two types of entities: State governments and MPOs. State governments do not meet the definition of a small entity under 5 U.S.C. 601, which have a population of less than 50,000.

The MPOs are considered governmental jurisdictions, and to qualify as a small entity they would need to serve less than 50,000 people. The MPOs serve urbanized areas with populations of 50,000 or more. As discussed in the RIA, the proposed rule

is expected to impose costs on MPOs that serve populations exceeding 200,000. Therefore, the MPOs that incur economic impacts under this proposed rule do not meet the definition of a small entity.

I hereby certify that this regulatory action would not have a significant impact on a substantial number of small entities.

<sup>122</sup> Includes VOCs, NO<sub>x</sub>, PM<sub>2.5</sub>, and CO.

<sup>123</sup> Approximately 13 percent is assumed because one of the eight performance measures (Total Emissions Reduction) is aimed at reducing emissions.

<sup>124</sup> Ibid.

<sup>125</sup> Ibid.

<sup>126</sup> Ibid.

<sup>127</sup> Fifty percent is assumed because one of the two CMAQ performance measures (Total Emissions Reduction) is aimed at reducing emissions.

<sup>128</sup> In 2011, emissions by highway vehicles totaled 3 million tons VOCs, 4.1 million tons NO<sub>x</sub>, 183,000 tons PM<sub>2.5</sub>, and 34.2 million tons CO. Source: EPA Office of Air Quality Planning and Standards, summary data, included in EPA Greenhouse Gas Inventory for 2012 (<https://www3.epa.gov/climatechange/ghgemissions/usinventoryreport/archive.html>), and EPA, “National Emissions Inventory: Air Pollutant Emissions Trends Data,” 2012, document posted to the Docket. Because these estimates are updated over time, there are variations in these data year-to-year. The FHWA will update the data at the Final Rule stage.

### *C. Unfunded Mandates Reform Act of 1995*

The FHWA has determined that this NPRM does not impose unfunded mandates as defined by the Unfunded Mandates Reform Act of 1995 (Pub. L. 104–4, March 22, 1995, 109 Stat. 48). This rule does not include a Federal mandate that may result in expenditures of \$143.1 million or more in any one year (when adjusted for inflation) in 2012 dollars for either State, local, and tribal governments in the aggregate, or by the private sector. The FHWA will publish a final analysis, including its response to public comments, when it publishes a final rule. Additionally, the definition of “Federal mandate” in the Unfunded Mandates Reform Act excludes financial assistance of the type in which State, local, or tribal governments have authority to adjust their participation in the program in accordance with changes made in the program by the Federal Government. The Federal-aid highway program permits this type of flexibility.

### *D. Executive Order 13132 (Federalism Assessment)*

The FHWA has analyzed this NPRM in accordance with the principles and criteria contained in Executive Order 13132. The FHWA has determined that this action does not have sufficient federalism implications to warrant the preparation of a federalism assessment. The FHWA has also determined that this action does not preempt any State law or State regulation or affect the States’ ability to discharge traditional State governmental functions.

### *E. Executive Order 12372 (Intergovernmental Review)*

The regulations implementing Executive Order 12372 regarding intergovernmental consultation on Federal programs and activities apply to this program. Local entities should refer to the Catalog of Federal Domestic Assistance Program Number 20.205, Highway Planning and Construction, for further information.

### *F. Paperwork Reduction Act*

Under the Paperwork Reduction Act of 1995 (PRA) (44 U.S.C. 3501, *et seq.*), Federal agencies must obtain approval from the OMB for each collection of information they conduct, sponsor, or require through regulations. The DOT has analyzed this proposed rule under the PRA and has determined that this proposal contains collection of information requirements for the purposes of the PRA.

This proposed rule provides definitions and outlines processes for

performance elements of this NPRM. Some burdens in this proposed rule would be realized in other reporting areas as described below. The PRA activities that are already covered by existing OMB Clearances have reference numbers for those clearances as follows:

HPMS information collection, OMB No. 2125–0028 with an expiration of May 2015 and CMAQ Program OMB 2125–0614 with an expiration date of (INSERT DATE) -. Any increase in PRA burdens caused by MAP–21 in these areas will be addressed in PRA approval requests associated with those rulemakings.

This rulemaking requires the submittal of performance reports. The DOT has analyzed this proposed rule under the PRA and has determined the following:

*Respondents:* Approximately 262 applicants consisting of State DOTs and MPOs.

*Frequency:* Biennially.

*Estimated Average Burden per*

*Response:* Approximately 416 hours to complete and submit the report.

*Estimated Total Annual Burden*

*Hours:* Approximately 65,312 hours annually.

The FHWA invites interested persons to submit comments on any aspect of the information collection. Comments submitted on the information collection proposed in this NPRM will be summarized or included, or both, in the request for OMB approval of this information collection.

### *G. National Environmental Policy Act*

The FHWA has analyzed this action for the purpose of the National Environmental Policy Act of 1969, as amended (42 U.S.C. 4321 *et seq.*), and has determined that this action would not have any effect on the quality of the environment and meets the criteria for the categorical exclusion at 23 CFR 771.117(c)(20).

### *H. Executive Order 12630 (Taking of Private Property)*

The FHWA has analyzed this proposed rule under Executive Order 12630, Governmental Actions and Interference with Constitutionally Protected Property Rights. The FHWA does not anticipate that this proposed action would affect a taking of private property or otherwise have taking implications under Executive Order 12630.

### *I. Executive Order 12988 (Civil Justice Reform)*

This action meets applicable standards in §§ 3(a) and 3(b)(2) of Executive Order 12988, Civil Justice

Reform, to minimize litigation, eliminate ambiguity, and reduce burden.

### *J. Executive Order 13045 (Protection of Children)*

We have analyzed this rule under Executive Order 13045, Protection of Children from Environmental Health Risks and Safety Risks. The FHWA certifies that this action would not cause an environmental risk to health or safety that might disproportionately affect children.

### *K. Executive Order 13175 (Tribal Consultation)*

The FHWA has analyzed this action under Executive Order 13175, dated November 6, 2000, and believes that the proposed action would not have substantial direct effects on one or more Indian tribes; would not impose substantial direct compliance costs on Indian tribal governments; and would not preempt tribal laws. The proposed rulemaking addresses obligations of Federal funds to State DOTs for Federal-aid highway projects and would not impose any direct compliance requirements on Indian tribal governments. Therefore, a tribal summary impact statement is not required.

### *L. Executive Order 13211 (Energy Effects)*

The FHWA has analyzed this action under Executive Order 13211, Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use. The FHWA has determined that this is not a significant energy action under that order and is not likely to have a significant adverse effect on the supply, distribution, or use of energy. Therefore, a Statement of Energy Effects is not required.

### *M. Executive Order 12898 (Environmental Justice)*

The E.O. 12898 requires that each Federal agency make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minorities and low-income populations. The FHWA has determined that this proposed rule does not raise any environmental justice issues.

### *N. Privacy Impact Assessment*

The FHWA continues to assess the privacy impacts of this proposed rule as required by section 522(a)(5) of the FY 2005 Omnibus Appropriations Act,

Public Law 108–447, 118 Stat. 3268 (December 8, 2004) [set out as a note to 5 U.S.C. 552a].

The FHWA is proposing the use of the new NPMRDS as the data source to calculate the metrics for the seven travel time/speed based measures to ensure consistency and coverage at a national level. This private sector data set provides average travel times derived from vehicle/passenger probe data traveling on the NHS. The FHWA recognizes that probe data is an evolving field and we will continue to evaluate the privacy risks associated with its use.

#### O. Regulation Identifier Number

An RIN is assigned to each regulatory action listed in the Unified Agenda of Federal Regulations. The Regulatory Information Service Center publishes the Unified Agenda in April and October of each year. The RIN number contained in the heading of this document can be used to cross-reference this action with the Unified Agenda.

#### List of Subjects in 23 CFR Part 490

Bridges, Highway safety, Highways and roads, Incorporation by reference, Reporting and recordkeeping requirements.

Issued in Washington DC, on April 1, 2016, under authority delegated in 49 CFR 1.85.

Gregory G. Nadeau,  
Federal Highway Administrator.

In consideration of the foregoing, FHWA proposes to amend 23 CFR part 490 as follows:

### PART 490—NATIONAL PERFORMANCE MANAGEMENT MEASURES

- 1. The authority citation for part 490 continues to read as follows:

**Authority:** 23 U.S.C. 134, 135, 148(i), and 150; 49 CFR 1.85.

- 2. Revise Subpart A to read as follows:

#### Subpart A—General Information

- Sec.
- 490.101 Definitions.
  - 490.103 Data requirements.
  - 490.105 Establishment of performance targets.
  - 490.107 Reporting on performance targets.
  - 490.109 Assessing significant progress toward achieving the performance targets for the National Highway Performance Program and the National Highway Freight Program.
  - 490.111 Incorporation by reference.

#### § 490.101 Definitions.

Unless otherwise specified, the following definitions apply to the entire part 490:

*Attainment area* as used in this Part is defined in § 450.104 of this title, Transportation Planning and Programming Definitions.

*Criteria pollutant* means any pollutant for which there is established a NAAQS at 40 CFR part 50. The transportation related criteria pollutants per 40 CFR 93.102(b)(1) are carbon monoxide, nitrogen dioxide, ozone, and particulate matter (PM<sub>10</sub> and PM<sub>2.5</sub>).

*Freight bottleneck*, as used in part 490, is defined as a segment of the Interstate System not meeting thresholds for freight reliability and congestion, as identified in § 490.613 and any other locations the State DOT wishes to identify as a bottleneck based on its own freight plans or related documents, if applicable.

*Full extent* means continuous collection and evaluation of pavement condition data over the entire length of the roadway.

*Highway Performance Monitoring System (HPMS)* is a national level highway information system that includes data on the extent, condition, performance, use, and operating characteristics of the Nation's highways.

*Mainline highways* means the through travel lanes of any highway. Mainline highways specifically exclude ramps, shoulders, turn lanes, crossovers, rest areas, and other pavement surfaces that are not part of the roadway normally traveled by through traffic.

*Maintenance area* as used in this Part is defined in § 450.104 of this title, Transportation Planning and Programming Definitions.

*Measure* means an expression based on a metric that is used to establish targets and to assess progress toward achieving the established targets (e.g., a measure for flight on-time performance is percent of flights that arrive on time, and a corresponding metric is an arithmetic difference between scheduled and actual arrival time for each flight).

*Metric* means a quantifiable indicator of performance or condition.

*Metropolitan Planning Organization (MPO)* as used in this Part is defined in § 450.104 of this title, Transportation Planning and Programming Definitions.

*National Ambient Air Quality Standards (NAAQS)* as used in this Part is defined in § 450.104 of this title, Transportation Planning and Programming Definitions.

*National Bridge Inventory (NBI)* is an FHWA database containing bridge information and inspection data for all highway bridges on public roads, on and off Federal-aid highways, including Tribally owned and federally owned

bridges, that are subject to the National Bridge Inspection Standards (NBIS).

*National Performance Management Research Data Set (NPMRDS)* means a data set derived from vehicle/passenger probe data (sourced from GPS, navigation units, cell phones) that includes average travel times representative of all traffic on each segment of the National Highway System (NHS), and additional travel times representative of freight trucks for those segments that are on the Interstate System. The data set includes records that contain average travel times for every 5 minutes of every day (24 hours) of the year recorded and calculated for every travel time segment where probe data is available. The NPMRDS does not include any imputed travel time data.

*Nonattainment area* as used in this Part is defined in § 450.104 of this title, Transportation Planning and Programming Definitions.

*Non-urbanized area* means a single geographic area that comprises all of the areas in the State that are not “urbanized areas” under 23 U.S.C. 101(a)(34).

*Performance period* means a determined time period during which condition/performance is measured and evaluated to: Assess condition/performance with respect to baseline condition/performance; and track progress toward the achievement of the targets that represent the intended condition/performance level at the midpoint and at the end of that time period. The term “performance period” applies to all proposed measures in this Part, except the measures proposed for the Highway Safety Improvement Program (HSIP) in Subpart B. Each performance period covers a 4-year duration beginning on a specified date (provided in § 490.105).

*Reporting segment* means the length of roadway that the State DOT and MPOs define for metric calculation and reporting and is comprised of one or more Travel Time Segments.

*Target* means a quantifiable level of performance or condition, expressed as a value for the measure, to be achieved within a time period required by the Federal Highway Administration (FHWA).

*Transportation Management Area (TMA)* as used in this Part is defined in § 450.104 of this title, Transportation Planning and Programming Definitions.

*Travel time data set* means either the NPMRDS or an equivalent data set that is used by State DOTs and MPOs as approved by FHWA, to carry out the requirements in Subparts E, F, and G of Part 490.



*Travel time reliability* means the consistency or dependability of travel times from day to day or across different times of the day.

*Travel time segment* means a contiguous stretch of the NHS for which average travel time data are summarized in the travel time data set.

#### **§ 490.103 Data requirements.**

(a) *In General.*—Unless otherwise noted below, the data requirements in this section applies to the measures identified in Subparts C through H of this part. Additional data requirements for specific performance management measures are identified in 23 CFR sections—

- (1) 490.309 for the condition of pavements on the Interstate System;
- (2) 490.309 for the condition of pavements on the non-Interstate NHS;
- (3) 490.409 for the condition of bridges on the NHS;
- (4) 490.509 for the performance of the Interstate System;
- (5) 490.509 for the performance of the non-Interstate NHS;
- (6) 490.609 for the freight movement on the Interstate System;
- (7) 490.709 for traffic congestion; and
- (8) 490.809 for on-road mobile source emissions.

(b) *Urbanized area data*—The State DOTs shall submit urbanized area data, including boundaries of urbanized areas, in accordance with the HPMS Field Manual for the purpose of the additional targets for urbanized and non-urbanized areas in § 490.105(e) and IRI rating determination in § 490.313(b)(1), and establishment and reporting on targets for the Peak Hour Travel Time measures in § 490.507(b) and the traffic congestion measure in § 490.707. The boundaries of urbanized areas shall be identified based on the most recent U.S. Decennial Census, unless FHWA approves adjustments to the urbanized area as provided by 23 U.S.C. 101(a)(34) and these adjustments are submitted to HPMS, available at the time when the State DOT Baseline Performance Period Report is due to FHWA.

(c) *Nonattainment and Maintenance areas data*—The State DOTs shall use the nonattainment and maintenance areas boundaries based on the effective date of U.S. EPA designations in 40 CFR part 81 at the time when the State DOT Baseline Performance Period Report is due to FHWA.

(d) *National Highway System data.*—The State DOTs shall document and submit the extent of the NHS in accordance with the HPMS Field Manual.

(e) *Travel Time Data Set.*—Travel time data needed to calculate the

measures in Subparts E, F, and G of this part will come from the NPMRDS, unless the State DOT requests, and FHWA approves, the use of an equivalent data source(s) that meets the requirements of this section. In accordance with 490.103(g), the State DOT shall establish, in coordination with applicable MPOs, a single travel time data set (*i.e.*, NPMRDS or equivalent data set) that will be used to calculate the annual metrics proposed in Subparts E, F, and G. The same data source shall be used for each year in a performance period. A State DOT and MPO(s) must use the same travel time data set for each reporting segment for the purposes of calculating the metrics and measures. The use of equivalent data source(s) shall comply with the following:

(1) State DOTs and MPOs shall use the same equivalent data source(s) for a calendar year; and

(2) The State DOT shall request FHWA approve the use of equivalent data source(s) no later than October 1st prior to the beginning of the calendar year in which the data source would be used to calculate metrics and FHWA would need to approve the use of that data source prior to a State DOT and MPO(s)'s implementation and use of that data source; and

(3) The State DOT shall make the equivalent data source(s) available to FHWA, on request; and

(4) The State DOT shall maintain and use a documented data quality plan to routinely check the quality and accuracy of data contained within the equivalent data source(s); and

(5) The equivalent data source(s) shall:

(i) Be used by both the State DOT and all MPOs within the State for all applicable travel time segments;

(ii) In combination with or in place of NPMRDS data, include:

(A) Contiguous segments that cover the full NHS, as defined in 23 U.S.C. 103, within the State and MPO boundary;

(B) Average travel times for at least the same number of 5 minute intervals and the same locations that would be available in the NPMRDS;

(iii) Be populated with actual measured vehicle travel times and shall not be populated with travel times derived from imputed (historic travel times or other estimates) methods;

(iv) Include, for each segment at 5 minute intervals throughout a full day (24 hours) for each day of the year, the average travel time, recorded to the nearest second, representative of at least one of the following:

(A) All traffic on each segment of the NHS;

(B) Freight vehicle traffic on each segment of the Interstate System;

(v) Include, for each segment, a recording of the time and date of each 5 minute travel time record;

(vi) Include the location (route, direction, State), length and begin and end points of each segment; and

(vii) Be available within 60 days of measurement.

(f) State DOTs, in coordination with MPOs, shall define a single set of reporting segments of the Interstate System and non-Interstate NHS for the purpose of calculating the measures specified in § 490.507, § 490.607, and § 490.707 in accordance with the following:

(1) Reporting segments shall be comprised of one or more contiguous Travel Time Segments of same travel direction;

(2) Reporting segments shall not exceed ½ mile in length in urbanized areas unless an individual Travel Time Segment is longer, and 10 miles in length in non-urbanized areas unless an individual Travel Time Segment is longer; and

(3) All reporting segments collectively shall be contiguous and cover the full extent of the directional mainline highways of the Interstate System and non-Interstate NHS required for reporting the measure.

(g) State DOTs shall submit their defined reporting segments to FHWA no later than November 1st prior to the beginning of a calendar year. If a State DOT is using an approved equivalent travel time data source during the performance period, the State DOT shall resubmit a new set of defined reporting segments that corresponds to the equivalent travel time data source. The State DOT shall submit the following to FHWA in HPMS:

(1) The Travel Time segment/s that make up each reporting segment; and

(2) The route and length (to the nearest thousandth of a mile) of each reporting segment; and

(3) The Desired Peak Period Travel Times (both morning and evening) that will be used to calculate the Peak Hour Travel Time measures identified in § 490.507(b) for each reporting segment that is fully included within urbanized areas with populations over one million.

(4) Documentation of the State DOT and applicable MPOs coordination and agreement on the travel time data set, the defined reporting segments, and the desired travel times submitted.

(5) If the defined reporting segments contain segments using equivalent data set, in part or in whole, all reporting

segment shall be referenced by HPMS location referencing standards.

**§ 490.105 Establishment of performance targets.**

(a) *In general.*—State Departments of Transportation (State DOTs) shall establish performance targets for all measures specified in paragraph (c) of this section for the respective target scope identified in paragraph (d) with the requirements specified in paragraph (e), and the Metropolitan Planning Organizations (MPOs) shall establish performance targets for all measures specified in paragraph (c) for respective target scope identified in paragraph (d) with the requirements specified in paragraph (f).

(b) *Highway Safety Improvement Program measures.*—State DOTs and MPOs shall establish performance targets for the Highway Safety Improvement Program (HSIP) measures in accordance with § 490.209.

(c) *Applicable measures.*—State DOTs and MPOs that include, within their respective geographic boundaries, any portion of the applicable transportation network or area shall establish performance targets for the performance measures identified in 23 CFR sections—

(1) 490.307(a)(1) and 490.307(a)(2) for the condition of pavements on the Interstate System;

(2) 490.307(a)(3) and 490.307(a)(4) for the condition of pavements on the National Highway System (NHS) (excluding the Interstate);

(3) 490.407(c)(1) and 490.407(c)(2) for the condition of bridges on the NHS;

(4) 490.507(a)(1) and 490.507(a)(2) for the NHS travel time reliability;

(5) 490.507(b)(1) and 490.507(b)(2) for the peak hour travel time;

(6) 490.607(a) and 490.607(b) for the freight movement on the Interstate System;

(7) 490.707 for traffic congestion; and

(8) 490.807 for on-road mobile source emissions.

(d) *Target scope.*—Targets established by the State DOT and MPO shall, regardless of ownership, represent the transportation network or geographic area, including bridges that cross State borders, that are applicable to the measures as specified in paragraphs (d)(1) and (2) of this section.

(1) State DOTs and MPOs shall establish Statewide and metropolitan planning area wide targets, respectively, that represent the condition/performance of the transportation network or geographic area that are applicable to the measures, as specified in 23 CFR sections—

(i) 490.303 for the condition of pavements on the Interstate System

measures specified in § 490.307(a)(1) and § 490.307(a)(2);

(ii) 490.303 for the condition of pavements on the National Highway System (NHS) (excluding the Interstate) measures specified in § 490.307(a)(3) and § 490.307(a)(4);

(iii) 490.403 for the condition of bridges on the NHS measures specified in § 490.407(c)(1) and § 490.407(c)(2);

(iv) 490.503(a)(1) for NHS travel time reliability measures specified in § 490.507(a)(1) and § 490.507(a)(2);

(v) 490.603 for the freight movement on the Interstate System measures specified in § 490.607(a) and § 490.607(b); and

(vi) 490.803 for the on-road mobile source emissions measure identified in § 490.807.

(2) State DOTs and MPOs shall establish a single urbanized area target that represents the performance of the transportation network in each area applicable to the measures, as specified in 23 CFR sections—

(i) 490.503(a)(2) for the peak hour travel time measures identified in § 490.507(b)(1) and § 490.507(b)(2); and

(ii) 490.703 for the traffic congestion measure identified in § 490.707.

(3) For the purpose of target establishment in this section, reporting targets and progress evaluation in § 490.107 and significant progress determination in § 490.109, State DOTs shall declare and describe the NHS limits and urbanized area boundaries within the State boundary in the Baseline Performance Period Report required by § 490.107(b)(1). Any changes in NHS limits or urbanized area boundaries during a performance period would not be accounted for until the following performance period.

(e) State DOTs shall establish targets for each of the performance measures identified in paragraph (c) of this section for respective target scope identified in paragraph (d) of this section as follows:

(1) *Schedule.*—State DOTs shall establish targets not later than 1 year of the effective date of this rule and for each performance period thereafter, in a manner that allows for the time needed to meet the requirements specified in this section and so that the final targets are submitted to FHWA by the due date provided in § 490.107(b).

(2) *Coordination.*—State DOTs shall coordinate with relevant MPOs on the selection of targets in accordance with 23 U.S.C. 135(d)(2)(B)(i)(II) to ensure consistency, to the maximum extent practicable.

(3) *Additional targets for urbanized and non-urbanized areas.*—In addition to statewide targets, described in

paragraph (d)(1) of this section, State DOTs may, as appropriate, for each statewide target establish additional targets for portions of the State.

(i) A State DOT shall declare and describe in the Baseline Performance Period Report required by § 490.107(b)(1) the boundaries used to establish each additional target. Any changes in boundaries during a performance period would not be accounted for until the following performance period.

(ii) State DOTs may select any number and combination of urbanized area boundaries and may also select a non-urbanized area boundary for the establishment of additional targets.

(iii) The boundaries used by the State DOT for additional targets shall be contained within the geographic boundary of the State.

(iv) State DOTs shall evaluate separately the progress of each additional target and report that progress as required under § 490.107(b)(2)(ii)(B) and § 490.107(b)(3)(ii)(B).

(v) Additional targets for urbanized areas and the non-urbanized area are not applicable to the peak hour travel time measures, traffic congestion measures, and on-road mobile source emissions measures in paragraphs (c)(5), (c)(7), and (c)(8) of this section, respectively.

(4) *Time horizon for targets.*—State DOTs shall establish targets for a performance period as follows:

(i) The performance period will begin on:

(A) January 1st of the year in which the Baseline Performance Period Report is due to FHWA and will extend for a duration of 4 years for the measures in paragraphs (c)(1) through (c)(7) of this section; and

(B) October 1st of the year prior to which the Baseline Performance Report is due to FHWA and will extend for a duration of 4 years for the measure in paragraph (c)(8) of this section.

(ii) The midpoint of a performance period will occur 2 years after the beginning of a performance period described in paragraph (e)(4)(i) of this section.

(iii) Except as provided in paragraphs (e)(7) and (e)(8)(vi) of this section, State DOTs shall establish 2-year targets that reflect the anticipated condition/performance level at the midpoint of each performance period for the measures in paragraphs (c)(1) through (c)(7) of this section, and the anticipated cumulative emissions reduction to be reported for the first 2 years of a performance period by applicable criteria pollutant and precursor for the



measure in paragraph (c)(8) of this section.

(iv) State DOTs shall establish 4-year targets that reflect the anticipated condition/performance level at the end of each performance period for the measures in paragraphs (c)(1) through (c)(7) of this section, and the anticipated cumulative emissions reduction to be reported for the entire performance period by applicable criteria pollutant and precursor for the measure in paragraph (c)(8) of this section.

(5) *Reporting.*—State DOTs shall report 2-year targets, 4-year targets, the basis for each established target, progress made toward the achievement of targets, and other requirements to FHWA in accordance with § 490.107, and the State DOTs shall provide relevant MPO(s) targets to FHWA, upon request, each time the relevant MPOs establish or adjust MPO targets, as described in paragraph (f) of this section.

(6) *Target adjustment.*—State DOTs may adjust an established 4-year target in the Mid Performance Period Progress Report, as described in § 490.107(b)(2). Any adjustments made to 4-year targets established for the peak hour travel time measure specified in paragraph (c)(5) or traffic congestion measure in paragraph (c)(7) of this section shall be agreed upon and made collectively by all State DOTs and MPOs that include any portion of the NHS in the respective urbanized area applicable to the measure.

(7) *Phase-in of new requirements for Interstate System pavement condition measures and the non-Interstate NHS travel time reliability measures.*—The following requirements apply only to the first performance period and to the measures in §§ 490.307(a)(1) and (2) and § 490.507(a)(2):

(i) State DOTs shall establish their 4-year targets, required under paragraph (4)(iv), and report these targets in their Baseline Performance Period Report, required under § 490.107(b)(1);

(ii) State DOTs shall not report 2-year targets, described in paragraph (e)(4)(iii) of this section, and baseline condition/performance in their Baseline Performance Period Report; and

(iii) State DOTs shall use the 2-year condition/performance in their Mid Performance Period Progress Report, described in § 490.107(b)(2)(ii)(A) as the baseline condition/performance. State DOTs may also adjust their 4-year targets, as appropriate.

(iv) State DOTs shall annually report metrics for all mainline highways on the NHS throughout the performance period, as required in § 490.511(d).

(8) *Urbanized area specific targets.*—The following requirements apply to establishing targets for the peak hour travel time measures specified in paragraph (c)(5) and traffic congestion measure in paragraph (c)(7) of this section, as their target scope provided in paragraph (d)(2) of this section:

(i) State DOTs, with mainline highways on the Interstate System that cross any part of an urbanized area with a population more than 1 million within its geographic State boundary, shall establish target for the measure specified in § 490.507(b)(1) for the urbanized area. State DOTs, with mainline highways on the non-Interstate NHS that cross any part of an urbanized area with a population more than 1 million within its geographic State boundary, shall establish target for the measure specified in § 490.507(b)(2) for the urbanized area.

(ii) If any part of the urbanized area for either of the peak hour travel time measures, provided for in paragraph (i) of this section, contains any part of a nonattainment or maintenance area for any one of the criteria pollutants, as specified in § 490.703, then that State DOT shall establish targets for the measure specified in § 490.707.

(iii) If required to establish a target for a peak-hour travel time measure, as described in paragraph (e)(8)(i) of this section and/or a target for a traffic congestion measure, as described in paragraph (e)(8)(ii), State DOTs shall comply with the following:

(A) For each urbanized area, only one 2-year target and one 4-year target for the entire urbanized area shall be established regardless of roadway ownership.

(B) For each urbanized area, all State DOTs and MPOs that contain, within their respective boundaries, any portion of the NHS network in that urbanized area shall agree on one 2-year and one 4-year target for that urbanized area. The targets reported, in accordance with § 490.105(e)(5) and § 490.105(f)(7), by the State DOTs and MPOs for that urbanized area shall be identical.

(C) State DOTs shall meet all reporting requirements in § 490.107 for the entire performance period even if there is a change of population, NHS designation, or nonattainment/maintenance area designation during that performance period.

(D) The 1 million population threshold, in paragraph (e)(8)(i) of this section, shall be determined based on the most recent U.S. Decennial Census available at the time when the State DOT Baseline Performance Period Report is due to FHWA.

(E) NHS designations, in paragraphs (e)(8)(i) and (ii) of this section, shall be determined from the State DOT Baseline Performance Period Report required in § 490.107(b)(1)(ii)(E).

(F) The designation of nonattainment or maintenance areas, in paragraph (ii) of this section, shall be determined based on the effective date of U.S. Environmental Protection Agency's designation under the NAAQS in 40 CFR part 81 at the time when the State DOT Baseline Performance Period Report is due to FHWA.

(iv) If a State DOT does not meet the criteria specified in paragraph (e)(8)(i) of this section for both peak-hour travel time measures at the time when the State DOT Baseline Performance Period Report is due to FHWA, then that State DOT is not required to establish targets for traffic congestion measure for that performance period.

(v) If a State DOT does not meet the criteria specified in paragraph (ii) at the time when the State DOT Baseline Performance Period Report is due to FHWA, then that State DOT is not required to establish targets for the traffic congestion measure for that performance period.

(vi) The following requirements apply only to the first performance period and the traffic congestion measure in § 490.707:

(A) State DOTs shall establish their 4-year targets, required under paragraph § 490.105(e)(4)(iv), and report these targets in their Baseline Performance Period Report, required under § 490.107(b)(1);

(B) State DOTs shall not report 2-year targets, described in § 490.105(e)(4)(ii) of this section, and baseline condition/performance in their Baseline Performance Period Report; and

(C) State DOTs shall use the 2-year condition/performance in their Mid Performance Period Progress Report, described in § 490.107(b)(2)(ii)(A) as the baseline condition/performance. The established baseline condition/performance shall be collectively developed and agreed upon with relevant MPOs.

(D) State DOTs may, as appropriate, adjust their 4-year target(s) in their Mid Performance Period Progress Report, described in § 490.107(b)(2)(ii)(A). Adjusted 4-year target(s) shall be developed and collectively agreed upon with relevant MPO(s), as described in paragraph (e)(6) of this section.

(E) State DOTs shall annually report metrics for all mainline highways on the NHS for all applicable urbanized area(s) throughout the performance period, as required in § 490.711(f).



(9) *Targets for on-road mobile source emissions measure.*—The following requirements apply to establishing targets for the measures specified in paragraph (c)(8) of this section:

(i) The State DOTs shall establish statewide targets for the on-road mobile source emissions measure for all nonattainment and maintenance areas for all applicable criteria pollutants and precursors specified in § 490.803.

(ii) For all nonattainment and maintenance areas within the State geographic boundary, the State DOT shall establish separate statewide targets for each of the applicable criteria pollutants and precursors.

(iii) The established targets, as specified in paragraph (e)(4) of this section, shall reflect the anticipated cumulative emissions reduction to be reported in the CMAQ Public Access System required in § 490.809(a).

(iv) In addition to the statewide targets in paragraph (e)(9)(i) of this section, State DOTs may, as appropriate, establish additional targets for any number and combination of nonattainment and maintenance areas by applicable criteria pollutant within the geographic boundary of the State. If a State DOT establishes additional targets for nonattainment and maintenance areas, it shall report the targets in the Baseline Performance Period Report required by § 490.107(b)(1). State DOTs shall evaluate separately the progress of each of these additional targets and report that progress as required under § 490.107(b)(2)(ii)(B) and § 490.107(b)(3)(ii)(B).

(v) The designation of nonattainment or maintenance areas shall be determined based on the effective date of U.S. Environmental Protection Agency's designation under the NAAQS in 40 CFR part 81 at the time when the State DOT Baseline Performance Period Report is due to FHWA.

(vi) The State DOT shall meet all reporting requirements in § 490.107 for the entire performance period even if there is a change of nonattainment or maintenance area designation status during that performance period.

(vii) If a State geographic boundary does not contain any part of nonattainment or maintenance areas for applicable criteria pollutants and precursors at the time when the State DOT Baseline Performance Period Report is due to FHWA, then that State DOT is not required to establish targets for on-road mobile source emissions measures for that performance period.

(f) The MPOs shall establish targets for each of the performance measures identified in paragraph (c) of this

section for the respective target scope identified in paragraph (d) of this section as follows:

(1) *Schedule.*—The MPOs shall establish targets no later than 180 days after the respective State DOT(s) establishes their targets, as provided in paragraph (e)(1) of this section.

(i) The MPOs shall establish 4-year targets, described in paragraph (e)(4)(iv) of this section, for all applicable measures, described in paragraphs (c) and (d) of this section.

(ii) Except as provided in paragraph (f)(4)(vi) of this section, the MPOs shall establish 2-year targets, described in paragraph (e)(4)(iii) of this section for the peak hour travel time, traffic congestion and on-road source emissions measures, described in paragraphs (c) and (d) of this section as their applicability criteria described in paragraphs (f)(4)(i), (f)(4)(ii), and (f)(5)(iii) of this section, respectively.

(iii) If an MPO does not meet the criteria described in paragraphs (f)(4)(i), (f)(4)(ii), or (f)(5)(iii) of this section, the MPO is not required to establish 2-year target(s) for the corresponding measure(s).

(2) *Coordination.*—The MPOs shall coordinate with relevant State DOT(s) on the selection of targets in accordance with 23 U.S.C. 134(h)(2)(B)(i)(II) to ensure consistency, to the maximum extent practicable.

(3) *Target establishment options.*—For each performance measure identified in paragraph (c) of this section, except the peak hour travel time measures, the traffic congestion measure, and MPOs meeting the criteria under paragraph (5)(iii) for on-road mobile source emission measure, the MPOs shall establish a target by either:

(i) Agreeing to plan and program projects so that they contribute toward the accomplishment of the relevant State DOT target for that performance measure; or

(ii) Committing to a quantifiable target for that performance measure for their metropolitan planning area.

(4) *Urbanized area specific targets.*—The following requirements apply to establishing targets for the peak hour travel time measures specified in paragraph (c)(5) and traffic congestion measure in paragraph (c)(7) of this section, as their target scope provided in paragraph (d)(2) of this section:

(i) MPOs shall establish targets for the measure specified in § 490.507(b)(1) when mainline highways on the Interstate System within their metropolitan planning area boundary cross any part of an urbanized area with a population more than 1 million. MPOs shall establish targets for the measure

specified in § 490.507(b)(2) when mainline highways on the non-Interstate NHS within their metropolitan planning area boundary cross any part of an urbanized area with a population more than 1 million.

(ii) MPOs shall establish targets for the measure specified in § 490.707 when mainline highways on the NHS within their metropolitan planning area boundary cross any part of an urbanized area with a population more than 1 million, and that portion of their metropolitan planning area boundary also contains any portion of a nonattainment or maintenance area for any one of the criteria pollutants, as specified in § 490.703. If an MPO is not required to establish a target for the measure specified in § 490.707, but any part of the urbanized area for either of the peak hour travel time measures, provided for in paragraph (i) of this section, contains any part of a nonattainment or maintenance area for any one of the criteria pollutant, as specified in § 490.703, then that MPO should coordinate with relevant State DOT(s) and MPO(s) in the target establishment process for the measure specified in § 490.707.

(iii) If required to establish a target for a peak-hour travel time measure, as described in paragraph (f)(4)(i) of this section and/or traffic congestion measure, as described in paragraph (f)(4)(ii), MPOs shall comply with the following:

(A) For each urbanized area, only one 2-year target and one 4-year target for the entire urbanized area shall be established regardless of roadway ownership.

(B) For each urbanized area, all State DOTs and MPOs that contain, within their respective boundaries, any portion of the NHS network in that urbanized area shall agree on one 2-year and one 4-year target for that urbanized area. The targets reported, in accordance with § 490.105(e)(5) and § 490.105(f)(7), by the State DOTs and MPOs for that urbanized area shall be identical.

(C) MPOs shall meet all reporting requirements in § 490.107(c) for the entire performance period even if there is a change of population, NHS designation, or nonattainment/maintenance area designation status during that performance period.

(D) The 1 million population threshold, in paragraph (f)(4)(i) of this section, shall be determined based on the most recent U.S. Decennial Census available at the time when the State DOT Baseline Performance Period Report is due to FHWA.

(E) NHS designations, in paragraphs (f)(4)(i) and (ii) of this section, shall be

determined from the State DOT Baseline Performance Period Report required in § 490.107(b)(1)(ii)(E).

(F) The designation of nonattainment or maintenance areas, in paragraph (f)(4)(ii) of this section, shall be determined based on the effective date of U.S. Environmental Protection Agency's designation under the NAAQS in 40 CFR part 81 at the time when the State DOT Baseline Performance Period Report is due to FHWA.

(iv) If an MPO does not meet the criteria specified in paragraph (f)(4)(i) of this section at the time when the State DOT Baseline Performance Period Report is due to FHWA, then that MPO is not required to establish targets for the peak hour travel time measure for that performance period.

(v) If an MPO does not meet the criteria specified in paragraph (f)(4)(ii) of this section at the time when the State DOT Baseline Performance Period Report is due to FHWA, then that MPO is not required to establish targets for the traffic congestion measure for that performance period.

(vi) The following requirements apply only to the first performance period and the traffic congestion measure in § 490.707:

(A) The MPOs shall not report 2-year targets, described in paragraph (f)(4)(iii)(A) of this section,

(B) The MPOs shall use the 2-year condition/performance in State DOT Mid Performance Period Progress Report, described in § 490.107(b)(2)(ii)(A) as baseline condition/performance. The established baseline condition/performance shall be agreed upon and made collectively with relevant State DOTs.

(C) The MPOs may, as appropriate, adjust their 4-year target(s). Adjusted 4-year target(s) shall be collectively developed and agreed upon with all relevant State DOT(s), as described in paragraph (f)(7) of this section.

(5) *Targets for on-road mobile source emissions measures.*—The following requirements apply to establishing targets for the measure in paragraph (c)(8) of this section:

(i) The MPO shall establish targets for each of the applicable criteria pollutants and precursors, specified in § 490.803, for which it is in nonattainment or maintenance, within its metropolitan planning area boundary.

(ii) The established targets, as specified in paragraph (e)(4) of this section, shall reflect the anticipated cumulative emissions reduction to be reported in the CMAQ Public Access System required in § 490.809(a).

(iii) If any part of a designated nonattainment and maintenance area

within the metropolitan planning area overlaps the boundary of an urbanized area with a population more than 1 million in population, then that MPO shall establish both 2-year and 4-year targets for their metropolitan planning area.

(iv) For the nonattainment and maintenance areas within the metropolitan planning area that do not meet the criteria in paragraph (f)(5)(iii) of this section, MPOs shall establish 4-year targets for their metropolitan planning area, as described in paragraph (f)(3) of this section.

(v) The designation of nonattainment or maintenance areas shall be determined based on the effective date of U.S. Environmental Protection Agency's designation under the NAAQS in 40 CFR part 81 at the time when the State DOT Baseline Performance Period Report is due to FHWA.

(vi) The MPO shall meet all reporting requirements in § 490.107(c) for the entire performance period even if there is a change of nonattainment or maintenance area designation status or population during that performance period.

(vii) If a metropolitan planning area boundary does not contain any part of nonattainment or maintenance areas for applicable criteria pollutants and precursors at the time when the State DOT Baseline Performance Period Report is due to FHWA, then that MPO is not required to establish targets for on-road mobile source emissions measures for that performance period.

(6) *MPO response to State DOT target adjustment.*—For the established targets in paragraph (f)(3) of this section, if the State DOT adjusts a 4-year target in the State DOT's Mid Performance Period Progress Report and if, for that respective target, the MPO established a target by supporting the State DOT target as allowed under paragraph (f)(3)(i) of this section, then the MPO shall, within 180 days, report to the State DOT whether they will either:

(i) Agree to plan a program of projects so that they contribute to the adjusted State DOT target for that performance measure; or

(ii) Commit to a new quantifiable target for that performance measure for its metropolitan planning area.

(7) *Target adjustment.*—If the MPO establishes its target by committing to a quantifiable target, described in paragraph (f)(3)(ii) of this section or establishes target(s) for on-road source emissions measure required in paragraph (f)(5)(iii) of this section, then the MPOs may adjust its target(s) in a manner that is collectively developed, documented, and mutually agreed upon

by the State DOT and MPO. Any adjustments made to 4-year targets, established for the peak hour travel time measure or traffic congestion measure in paragraph (f)(4)(i) or (ii) of this section, shall be collectively developed and agreed upon by all State DOTs and MPOs that include any portion of the NHS in the respective urbanized area applicable to the measure.

(8) *Reporting.*—The MPOs shall report targets and progress toward the achievement of their targets as specified in § 490.107(c). After the MPOs establish or adjust their targets, the relevant State DOT(s) must be able to provide these targets to FHWA upon request.

#### **§ 490.107 Reporting on performance targets.**

(a) *In general.*—All State DOTs and MPOs shall report the information specified in this section for the targets required in § 490.105.

(1) All State DOTs and MPOs shall report in accordance with the schedule and content requirements under paragraphs (b) and (c) of this section, respectively.

(2) For the measures identified in § 490.207(a), all State DOTs and MPO shall report on performance in accordance with § 490.213.

(3) State DOTs shall report using an electronic template provided by FHWA.

(4) *Initial State Performance Report.*—State DOTs shall submit an Initial Performance Report to FHWA by October 1, 2016, that includes the following information:

(i) The condition/performance of the NHS in the State for measures where the State DOT is required to establish targets and where data is available;

(ii) The effectiveness of the investment strategy document in the State asset management plan for the National Highway System;

(iii) Progress toward targets the State DOT are to establish, which may only be a description of how State DOTs are coordinating with relevant MPOs and other agencies in target selection for the targets to be reported in the first State Biennial Performance Report in 2018; and

(iv) The ways in which the State is addressing congestion at freight bottlenecks, including those identified in the National Freight Strategic Plan, within the State.

(5) State DOTs shall report initial 2-year and 4-year targets, as described in § 490.105(e)(4), to FHWA within 30 days of target establishment by either amending the Initial State Performance Report due in October 2016, or through the Baseline Performance Report for the

first performance period, as described in § 490.107(b)(1)(i), whichever comes first.

(b) *State Biennial Performance Report.*—State DOTs shall report to FHWA baseline condition/performance at the beginning of a performance period and progress achievement at both the midpoint and end of a performance period. State DOTs shall report at an ongoing 2-year frequency as specified in paragraphs (b)(1), (b)(2), and (b)(3) of this section.

(1) *Baseline Performance Period Report.*

(i) *Schedule.*—State DOTs shall submit a Baseline Performance Period Report to FHWA by October 1 of the first year in a performance period. State DOTs shall submit their first Baseline Performance Period Report to FHWA by October 1, 2018, and subsequent Baseline Performance Period Reports to FHWA by October 1 every 4 years thereafter.

(ii) *Content.*—The State DOT shall report the following information in each Baseline Performance Period Report:

(A) *Targets.*—2-year and 4-year targets for the performance period, as required in § 490.105(e), and a discussion, to the maximum extent practicable, of the basis for each established target;

(B) *Baseline condition/performance.*—Baseline condition/performance derived from the latest data collected through the beginning date of the performance period specified in § 490.105(e)(4)(i) for each target, required under paragraph (b)(1)(ii)(A) of this section;

(C) *Relationship with other performance expectations.*—A discussion, to the maximum extent practicable, on how the established targets in paragraph (b)(1)(ii)(A) of this section support expectations documented in longer range plans, such as the State asset management plan required by 23 U.S.C. 119(e) and the long-range statewide transportation plan provided in part 450 of this chapter;

(D) *Urbanized area boundaries and population data for targets.*—For the purpose of determining target scope in § 490.105(d), determining IRI rating in § 490.313(b)(1), and establishing additional targets for urbanized and non-urbanized areas in § 490.105(e)(3), State DOTs shall document the boundary extent for all applicable urbanized areas and the latest Decennial Census population data, based on information in HPMS;

(E) *NHS limits for targets.*—For the purpose of determining target scope in § 490.105(d), State DOTs shall document the extent of the NHS, based on information in HPMS;

(F) *Congestion at freight bottlenecks.*—Discussion on the ways in which the State DOT is addressing congestion at freight bottlenecks within the State, including those identified in the National Freight Strategic Plan, and any additional locations that the State DOT wishes to include as identified through comprehensive freight improvement efforts of Statewide Freight Planning or MPO freight plans; the Statewide Transportation Improvement Program and Transportation Improvement Program; regional or corridor level efforts; other related planning efforts; and operational and capital activities targeted to improve freight movement on the Interstate System;

(G) *Nonattainment and maintenance area for targets.*—Where applicable, for the purpose of determining target scope in § 490.105(d) and any additional targets under § 490.105(e)(9)(iv), State DOTs shall describe the boundaries of the U.S. Environmental Protection Agency's designated nonattainment and maintenance areas, as described in § 490.103(c) and § 490.105(e)(9)(v);

(H) *MPO CMAQ Performance Plan.*—Where applicable, State DOTs shall include as an attachment the MPO CMAQ Performance Plan, described in paragraph (c)(3) of this section.

(2) *Mid Performance Period Progress Report.*

(i) *Schedule.*—State DOTs shall submit a Mid Performance Period Progress Report to FHWA by October 1 of the third year in a performance period. State DOTs shall submit their first Mid Performance Period Progress Report to FHWA by October 1, 2020, and subsequent Mid Performance Period Progress Reports to FHWA by October 1 every 4 years thereafter.

(ii) *Content.*—The State DOT shall report the following information in each Mid Performance Period Progress Report:

(A) *2-year condition/performance.*—the actual condition/performance derived from the latest data collected through the midpoint of the performance period, specified in § 490.105(e)(4), for each State DOT reported target required in paragraph (b)(1)(ii)(A) of this section;

(B) *2-year progress in achieving performance targets.*—A discussion of the State DOT's progress toward achieving each established 2-year target in paragraph (b)(1)(ii)(A) of this section. The State DOT shall compare the actual 2-year condition/performance in paragraph (b)(2)(ii)(A) of this section, within the boundaries and limits documented in paragraphs (b)(1)(ii)(D) and (b)(1)(ii)(E) of this section, with the

respective 2-year target and document in the discussion any reasons for differences in the actual and target values;

(C) *Investment strategy discussion.*—A discussion on the effectiveness of the investment strategies developed and documented in the State asset management plan for the NHS required under 23 U.S.C. 119(e);

(D) *Congestion at freight bottlenecks.*—Discussion on progress of the State DOT's efforts in addressing congestion at freight bottlenecks within the State, as described in paragraph (b)(1)(ii)(F) of this section;

(E) *Target adjustment discussion.*—When applicable, a State DOT may submit an adjusted 4-year target to replace an established 4-year target in paragraph (b)(1)(ii)(A) of this section. If the State DOT adjusts its target, it shall include a discussion on the basis for the adjustment and how the adjusted target supports expectations documented in longer range plans, such as the State asset management plan and the long-range statewide transportation plan. The State DOT may only adjust a 4-year target at the midpoint and by reporting the change in the Mid Performance Period Progress Report;

(F) *2-year significant progress discussion for the National Highway Performance Program (NHPP) targets and the National Highway Freight Program (NHFP) targets.*—State DOTs shall discuss the progress they have made toward the achievement of all 2-year targets established for the NHPP measures in § 490.105(c)(1) through (c)(5) and NHFP measures in § 490.105(c)(6). This discussion should document a summary of prior accomplishments and planned activities that will be conducted during the remainder of the Performance Period to make significant progress toward that achievement of 4-year targets for applicable measures;

(G) *Extenuating Circumstances discussion on 2-year Targets.*—When applicable, for 2-year targets for the NHPP or NHFP, a State DOT may include a discussion on the extenuating circumstance(s), described in § 490.109(e)(5), beyond the State DOT's control that prevented the State DOT from making 2-year significant progress toward achieving NHPP or NHFP target(s) in paragraph (b)(2)(ii)(F) of this section;

(H) *Applicable Target Achievement Discussion.*—If FHWA determines that a State DOT has not made significant progress toward the achievement of any NHPP or NHFP targets in a biennial FHWA determination, then the State DOT shall include a description of the



actions they will undertake to achieve those targets as required under § 490.109(f). If FHWA determines under § 490.109(e) that the State DOT has made significant progress for NHPP or NHFP targets, then the State DOT does not need to include this description for those targets; and

(I) *MPO CMAQ Performance Plan.*—Where applicable, State DOTs shall include as an attachment the MPO CMAQ Performance Plan, described in paragraph (c)(3) of this section.

(3) *Full Performance Period Progress Report.*

(i) *Schedule.*—State DOTs shall submit a progress report on the full performance period to FHWA by October 1 of the first year following the reference performance period. State DOTs shall submit their first Full Performance Period Progress Report to FHWA by October 1, 2022, and subsequent Full Performance Period Progress Reports to FHWA by October 1 every 4 years thereafter.

(ii) *Content.*—The State DOT shall report the following information for each Full Performance Period Progress Report:

(A) *4-year condition/performance.*—The actual condition/performance derived from the latest data collected through the end of the Performance Period, specified in § 490.105(e)(4), for each State DOT reported target required in paragraph (b)(1)(ii)(A) of this section;

(B) *4-year progress in achieving performance targets.*—A discussion of the State DOT's progress made toward achieving each established 4-year target in paragraph (b)(1)(ii)(A) or in paragraph (b)(2)(ii)(E) of this section, when applicable. The State DOT shall compare the actual 4-year condition/performance in paragraph (b)(3)(ii)(A) of this section, within the boundaries and limits documented in paragraphs (b)(1)(ii)(D) and (b)(1)(ii)(E) of this section, with the respective 4-year target and document in the discussion any reasons for differences in the actual and target values;

(C) *Investment strategy discussion.*—A discussion on the effectiveness of the investment strategies developed and documented in the State asset management plan for the NHS required under 23 U.S.C. 119(e);

(D) *Congestion at freight bottlenecks.*—Discussion on progress of the State DOT's efforts in addressing congestion at freight bottlenecks within the State, as described in paragraph (1)(ii)(F) of this section;

(E) *4-year significant progress evaluation for applicable targets.*—State DOTs shall discuss the progress they have made toward the achievement of

all 4-year targets established for the NHPP measures in § 490.105(c)(1) through (c)(5) and NHFP measures in § 490.105(c)(6). This discussion shall include a summary of accomplishments achieved during the Performance Period to demonstrate whether the State DOT has made significant progress toward achievement of 4-year targets for those measures;

(F) *Extenuating circumstances discussion on applicable targets.*—When applicable, a State DOT may include discussion on the extenuating circumstance(s), described in § 490.109(e)(5), beyond the State DOT's control that prevented the State DOT from making a 4-year significant progress toward achieving NHPP or NHFP targets, described in paragraph (b)(3)(ii)(E) of this section;

(G) *Applicable Target Achievement Discussion.*—If FHWA determines that a State DOT has not made significant progress toward the achievement of any NHPP or NHFP targets in a biennial FHWA determinations, then the State DOT shall include a description of the actions they will undertake to achieve those targets as required under § 490.109(f). If FHWA determines in § 490.109(e) that the State DOT has made significant progress for NHPP or NHFP targets, then the State DOT does not need to include this description for those targets; and

(H) *MPO CMAQ Performance Plan.*—Where applicable, State DOTs shall include as an attachment the MPO CMAQ Performance Plan, described in paragraph (c)(3) of this section.

(c) *MPO Report.*—The MPOs shall establish targets in accordance with § 490.105 and report targets and progress toward the achievement of their targets in a manner that is consistent with the following:

(1) The MPOs shall report their established targets to their respective State DOT in a manner that is documented and mutually agreed upon by both parties.

(2) The MPOs shall report baseline condition/performance and progress toward the achievement of their targets in the system performance report in the metropolitan transportation plan in accordance with Part 450 of this chapter.

(3) MPOs serving a TMA with a population over one million representing nonattainment and maintenance areas for ozone, CO, or PM NAAQS shall develop a CMAQ performance plan as required by 23 U.S.C. 149(l). The CMAQ performance plan is not required when the MPO does not serve a TMA with a population over one million; the MPO is attainment for

ozone, CO, and PM NAAQS; or the MPO's nonattainment or maintenance area for ozone, CO, or PM NAAQS is outside the urbanized area boundary of the TMA with a population over one million.

(i) The CMAQ performance plan shall be submitted as a separate section attached to the State Biennial Performance Reports, as required under § 490.107(b), and be updated biennially on the same schedule as the State Biennial Performance Reports.

(ii) For traffic congestion and on-road mobile source emissions measures in Subparts G and H, the CMAQ performance plan submitted with the State DOT's Baseline Performance Period Report shall include:

(A) The 2-year and 4-year targets for the traffic congestion measure, identical to the relevant State DOT(s) reported target under paragraph (b)(1)(ii)(A) of this section, for each applicable urbanized area;

(B) The 2-year and 4-year targets for the on-road mobile source emissions measure for the performance period;

(C) Baseline condition/performance for each MPO reported traffic congestion target, identical to the relevant State DOT(s) reported baseline condition/performance under paragraph (b)(1)(ii)(B) of this section;

(D) Baseline condition/performance derived from the latest estimated cumulative emissions reductions from CMAQ projects for each MPO reported on-road mobile source emissions target; and

(E) A description of projects identified for CMAQ funding and how such projects will contribute to achieving the performance targets for these measures.

(iii) For traffic congestion and on-road mobile source emissions measures in Subparts G and H, the CMAQ performance plan submitted with the State DOT's Mid Performance Period Progress Report shall include:

(A) 2-year condition/performance for the traffic congestion measure, identical to the relevant State DOT(s) reported condition/performance under paragraph (b)(2)(ii)(A) of this section, for each applicable urbanized area;

(B) 2-year condition/performance derived from the latest estimated cumulative emissions reductions from CMAQ projects for each MPO reported on-road mobile source emissions target;

(C) An assessment of the progress of the projects identified in the CMAQ performance plan submitted with the Baseline Performance Period Report toward achieving the 2-year targets for these measures;

(D) When applicable, an adjusted 4-year target to replace an established 4-year target; and

(E) An update to the description of projects identified for CMAQ funding and how those updates will contribute to achieving the 4-year performance targets for these measures.

(iv) For traffic congestion and on-road mobile source emissions measures in Subparts G and H, the CMAQ performance plan submitted with the State DOT's Full Performance Period Progress Report shall include:

(A) 4-year condition/performance for the traffic congestion measure, identical to the relevant State DOT(s) reported condition/performance reported under paragraph (b)(3)(ii)(A) of this section, for each applicable urbanized area;

(B) 4-year condition/performance derived from the latest estimated cumulative emissions reductions from CMAQ projects for each MPO reported on-road mobile source emissions target; and

(C) An assessment of the progress of the projects identified in both paragraphs (c)(3)(ii)(C) and (c)(3)(iii)(D) of this section toward achieving the 4-year targets for these measures.

**§ 490.109 Assessing significant progress toward achieving the performance targets for the National Highway Performance Program and the National Highway Freight Program.**

(a) *In general.*—The FHWA will assess each of the State DOT targets separately for the measures specified in § 490.105(c)(1) through (c)(5) and the NHFP measures specified in § 490.105(c)(6) to determine the significant progress made toward the achievement of those targets.

(b) *Frequency.*—The FHWA will determine whether a State DOT has or has not made significant progress toward the achievement of applicable targets as described in paragraph (e) of this section at the midpoint and the end of each performance period.

(c) *Schedule.*—The FHWA will determine significant progress toward the achievement of a State DOT's NHPP and NHFP targets after the State DOT submits the Mid Performance Period Progress Report for progress toward the achievement of 2-year targets, and again after the State DOT submits the Full Performance Period Progress Report for progress toward the achievement of 4-year targets. The FHWA will notify State DOTs of the outcome of the determination of the State DOT's ability to make significant progress toward the achievement of its NHPP and NHFP targets.

(d) *Source of data/information.*—

(1) The FHWA will use the following sources of information to assess NHPP condition and performance progress:

(i) Data contained within the HPMS on June 15 of the year in which the significant progress determination is made that represents conditions from the prior year for targets established for Interstate System pavement condition measures, as specified in § 490.105(c)(1);

(ii) Data contained within the HPMS on August 15 of the year in which the significant progress determination is made that represents conditions from the prior year for targets established for non-Interstate NHS pavement condition measures, as specified in § 490.105(c)(2);

(iii) The most recently available data contained within the NBI as of June 15 of the year in which the significant progress determination is made for targets established for NHS bridge condition measures, as specified in § 490.105(c)(3);

(iv) The urbanized area boundary and NHS limit data in the HPMS as documented in the Baseline Performance Period Report specified in § 490.107(b)(1)(ii)(D) and (E);

(v) Data contained within the HPMS on August 15 of the year in which the significant progress determination is made that represents performance from the prior year for targets established for the Interstate System and non-Interstate NHS performance measures, as specified in § 490.105(c)(4) and (5); and

(vi) Population data as defined by the most recent U.S. Decennial Census for urbanized areas available at the time when the State DOT Baseline Performance Period Report is due to FHWA.

(2) The FHWA will use the data contained within the HPMS on August 15 of the year in which the significant progress determination is made that represents performance from the prior year for targets established for NHFP measures, as specified in § 490.105(c)(6), to assess NHFP targets and performance progress.

(e) *Significant progress determination for individual NHPP and NHFP targets.*

(1) *In general.*—The FHWA will biennially assess whether the State DOT has achieved or made significant progress toward each target established by the State DOT for the NHPP measures described in § 490.105(c)(1) through (c)(5) and NHFP measures described in § 490.105(c)(6). The FHWA will assess the significant progress of each statewide target separately using the condition/performance data/information sources described in paragraph (d) of this section. The FHWA

will not assess the progress achieved for any additional targets a State DOT may establish under § 490.105(e)(3).

(2) *Significant progress toward individual NHPP and NHFP targets.*—The FHWA will determine that a State DOT has made significant progress toward the achievement of each 2-year or 4-year applicable target if either:

(i) The actual condition/performance level is better than the baseline condition/performance reported in the State DOT Baseline Performance Period Report; or

(ii) The actual condition/performance level is equal to or better than the established target.

(3) *Phase-in of new requirements.*—The following requirements shall only apply to the first performance period and only to the Interstate System pavement condition targets and non-Interstate NHS travel time reliability targets, described in § 490.105(e)(7):

(i) At the midpoint of the first performance period, FHWA will not make a determination of significant progress toward the achievement of 2-year targets for Interstate System pavement condition measures.

(ii) The FHWA will classify the assessment of progress toward the achievement of targets in paragraph (e)(3)(i) of this section as “progress not determined” so that they will be excluded from the requirement under paragraph (e)(2) of this section.

(iii) FHWA will not make a determination of significant progress toward the achievement of 2-year targets for non-Interstate NHS travel time reliability measure.

(4) *Insufficient data and/or information.*—If a State DOT does not provide sufficient data and/or information, required under paragraph (d) of this section and § 490.107, necessary for FHWA to make significant progress determination for an NHPP or NHFP target, FHWA will determine that the State DOT has not made significant progress toward the achievement of the applicable target(s).

(5) *Extenuating circumstances.*—The FHWA will consider extenuating circumstances documented by the State DOT in the assessment of progress toward the achievement of NHPP and NHFP targets in the relevant State Biennial Performance Report, provided in § 490.107.

(i) The FHWA will classify the assessment of progress toward the achievement of an individual 2-year or 4-year target as “progress not determined” if the State DOT has provided an explanation of the extenuating circumstances beyond the control of the State DOT that prevented



it from making significant progress toward the achievement of a 2-year or 4-year target and the State DOT has quantified the impacts on the condition/performance that resulted from the circumstances, which are:

(A) Natural or man-made disasters that caused delay in NHPP or NHFP project delivery, extenuating delay in data collection, and/or damage/loss of data system;

(B) Sudden discontinuation of Federal government furnished data due to natural and man-made disasters or lack of funding; and/or

(C) New law and/or regulation directing State DOTs to change metric and/or measure calculation.

(ii) If the State DOT's explanation, described in paragraph (e)(5)(i) of this section, is accepted by FHWA, FHWA will classify the progress toward achieving the relevant target(s) as "progress not determined," and those targets will be excluded from the requirement in paragraph (e)(2) of this section.

*(f) Performance achievement.—*

(1) If FHWA determines that a State DOT has not made significant progress toward the achieving of NHPP targets, then the State DOT shall include as part of the next performance target report under section 150(e) [the Biennial Performance Report] a description of the actions the State DOT will undertake to achieve the targets related to the measure in which significant progress was not achieved as follows:

(i) If significant progress is not made for either target established for the Interstate System pavement condition measures, § 490.307(a)(1) and § 490.307(a)(2), then the State DOT shall document the actions they will take to improve Interstate Pavement conditions;

(ii) If significant progress is not made for either target established for the Non-Interstate System pavement condition measures, § 490.307(a)(3) and § 490.307(a)(4), then the State DOT shall document the actions they will take to improve Non-Interstate Pavement conditions;

(iii) If significant progress is not made for either target established for the NHS bridge condition measures, § 490.407(c)(1) and § 490.407(c)(2), then the State DOT shall document the actions they will take to improve the NHS bridge conditions;

(iv) If significant progress is not made for either target established for the NHS travel time reliability measures, § 490.507(a)(1) and § 490.407(a)(2), then the State DOT shall document the actions they will take to achieve the NHS travel time targets;

(v) If significant progress is not made for either urbanized area specific target, described in § 490.105(e)(8), established for the peak hour travel measures, § 490.507(b)(1) and § 490.407(b)(2) for an urbanized area, then the State DOT shall document the actions they will take to achieve both the Interstate and non-Interstate NHS peak hour travel time targets that urbanized area;

(2) If FHWA determines that a State DOT has not made significant progress toward achieving the NHFP targets established for either of the NHFP measures in § 490.607(a) or § 490.607(b), then the State DOT shall include as part of the next performance target report under section 150(e) [the Biennial Performance Report], a description of the action the State will undertake to achieve the targets, including—

(i) An identification of significant freight system trends, needs, and issues within the State;

(ii) A description of the freight policies and strategies that will guide the freight-related transportation investments of the State;

(iii) An inventory of freight bottlenecks within the State and a description of the ways in which the State DOT is allocating national highway freight program funds to improve those bottlenecks; and

(iv) A description of the actions the State DOT will undertake to achieve the targets established for the Freight measures in § 490.607(a) and § 490.607(b).

(3) The State DOT should, within 6 months of the significant progress determination, amend its Biennial Performance Report to document the information specified in this paragraph to ensure actions are being taken to achieve targets.

**§ 490.111 Incorporation by reference.**

(a) Certain material is incorporated by reference into this subpart with the approval of the Director of the Federal Register under 5 U.S.C. 552(a) and 1 CFR part 51. To enforce any edition other than that specified in this section, FHWA must publish a document in the **Federal Register** and the material must be available to the public. All approved material is available for inspection at the Federal Highway Administration, Office of Highway Policy Information (202–366–4631) and is available from the sources listed below. It is also available for inspection at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call 202–741–6030 or go to [http://www.archives.gov/federal\\_register/](http://www.archives.gov/federal_register/)

*code\_of\_federal\_regulations/ibr\_locations.html.*

(b) The Federal Highway Administration, 1200 New Jersey Avenue SE., Washington, DC 20590, [www.fhwa.dot.gov](http://www.fhwa.dot.gov).

(1) Highway Performance Monitoring System (HPMS) Field Manual, IBR approved for Subparts A through C, and E through G.

(2) Recording and Coding Guide for the Structure Inventory and Appraisal of the Nation's Bridges, Report No. FHWA–PD–96–001, December 1995 and errata, IBR approved for Subpart D.

(c) The American Association of State Highway and Transportation Officials, 444 North Capitol Street NW., Suite 249, Washington, DC 20001, (202) 624–5800, [www.transportation.org](http://www.transportation.org).

(1) AASHTO Standard M328–14, Standard Specification for Transportation Materials and Methods of Sampling and Testing, Standard Equipment Specification for Inertial Profiler, 2014, 34th/2014 Edition, AASHTO, 1–56051–606–4, IBR approved for Subpart C.

(2) AASHTO Standard R57–14, Standard Specification for Transportation Materials and Methods of Sampling and Testing, Standard Practice for Operating Inertial Profiling Systems, 2014, 34th/2014 Edition, AASHTO, 1–56051–606–4, IBR approved for Subpart C.

(3) AASHTO Standard R55–10 (2013), Standard Specification for Transportation Materials and Methods of Sampling and Testing, Standard Practice for Quantifying Cracks in Asphalt Pavement Surface, 2014, 34th/2014 Edition, AASHTO, 1–56051–606–4, IBR approved for Subpart C.

(4) AASHTO Standard PP67–14, Standard Specification for Transportation Materials and Methods of Sampling and Testing, Standard Practice for Quantifying Cracks in Asphalt Pavement Surfaces from Collected Images Utilizing Automated Methods, 2014, 34th/2014 Edition, AASHTO, 1–56051–606–4, IBR approved for Subpart C.

(5) AASHTO Standard PP68–14, Standard Specification for Collecting Images of Pavement Surfaces for Distress Detection, 2014, 34th/2014 Edition, AASHTO, 1–56051–606–4, IBR approved for Subpart C.

(6) AASHTO Standard R48–10 (2003), Standard Specification for Transportation Materials and Methods of Sampling and Testing, Standard Practice for Determining Rut Depth in Pavements, 2014, 34th/2014 Edition, AASHTO, 1–56051–606–4, IBR approved for Subpart C.



(7) AASHTO Standard PP69–14, Standard Specification for Transportation Materials and Methods of Sampling and Testing, Standard Practice for Determining Pavement Deformation Parameters and Cross Slope from Collected Transverse Profiles, 2013, 2014, 34th/2014 Edition, AASHTO, 1–56051–606–4, IBR approved for Subpart C.

(8) AASHTO Standard PP70–14, Standard Specification for Transportation Materials and Methods of Sampling and Testing, Standard Practice for Collection the Transverse Pavement Profile, 2014, 34th/2014 Edition, AASHTO, 1–56051–606–4, IBR approved for Subpart C.

(9) AASHTO Standard R36–13, Standard Specification for Transportation Materials and Methods of Sampling and Testing, Standard Practice for Evaluating Faulting of Concrete Pavements, 2014, 34th/2014 Edition, AASHTO, 1–56051–606–4, IBR approved for Subpart C.

(10) AASHTO Standard R43–13, Standard Specification for Transportation Materials and Methods of Sampling and Testing, Standard Practice for Quantifying Roughness of Pavement, 2014, 34th/2014 Edition, AASHTO, 1–56051–606–4, IBR approved for Subpart C.

■ 3. Add a new Subpart E to read as follows:

**Subpart E—National Performance Management Measures to Assess Performance of the National Highway System**

Sec.	
490.501	Purpose.
490.503	Applicability.
490.505	Definitions.
490.507	National Performance Management Measures for System Performance.
490.509	Data requirements.
490.511	Calculation of system performance metrics.
490.513	Calculation of system performance management measures.

**§ 490.501 Purpose.**

The purpose of this subpart is to implement the requirements of 23 U.S.C. 150(c)(3)(A)(ii)(IV) and (c)(3)(A)(ii)(V) to establish performance measures for State Departments of Transportation (State DOTs) and Metropolitan Planning Organizations (MPOs) to use to assess:

- (a) Performance of the Interstate System; and
- (b) Performance of the non-Interstate National Highway System (NHS).

**§ 490.503 Applicability.**

- (a) The performance measures are applicable to those portions of the

mainline highways on the NHS as provided below (and in more detail in § 490.507):

- (1) The Reliability measures in § 490.507(a) are applicable to all directional mainline highways on the Interstate System and non-Interstate NHS.

- (2) The Peak Hour Travel Time measures in § 490.507(b) are applicable to all directional mainline highways on the Interstate System and non-Interstate NHS that are within the boundary of urbanized areas with a population over one million.

**§ 490.505 Definitions.**

All definitions in § 490.101 apply to this subpart. Unless otherwise specified in this subpart, the following definitions apply:

*Desired Peak Period Travel Time* is the desired travel time on a specific reporting segment during the peak period that is defined in coordination between the State DOT and MPO.

*Level of Travel Time Reliability* is a comparison, expressed as a ratio, of the 80th percentile travel time of a reporting segment to the “normal” (50th percentile) travel time of a reporting segment occurring throughout a full calendar year.

*Normal Travel Time (or 50th percentile travel time)* is the time of travel to traverse the full extent of a reporting segment which is greater than the time for 50 percent of the travel in a calendar year to traverse the same reporting segment.

*Peak Hour Travel Time* is defined as the longest average annual travel time on a segment of roadway during the peak period.

*The Peak Period* is defined as non-holiday weekdays from 6:00 to 7:00 a.m., 7:00 to 8:00 a.m., 8:00 to 9:00 a.m., 4:00 to 5:00 p.m., 5:00 to 6:00 p.m. and 6:00 to 7:00 p.m.

*Peak Hour Travel Time Ratio* is defined as the ratio between the Peak Hour Travel Time and the Desired Peak Period Travel Time for a segment of roadway.

*Travel Time Cumulative Probability Distribution* means a representation of all the travel times for a road segment during a defined reporting period (such as annually) presented in a percentile ranked order as provided in the Travel Time Data Set. The normal (50th percentile) and 80th percentile travel times used to compute the Travel Time Reliability measure may be identified by the travel time cumulative probability distribution.

**§ 490.507 National Performance Management Measures for System Performance.**

There are four performance measures to assess the performance of the Interstate System and the performance of the non-Interstate NHS for the purpose of carrying out the National Highway Performance Program.

- (a) Two measures are used to assess Reliability. They are:

- (1) Percent of the Interstate System providing for Reliable Travel Times; and
- (2) Percent of the non-Interstate NHS providing for Reliable Travel Times.

- (b) Two measures are used to assess Peak Hour Travel Time in urbanized areas over 1,000,000 in population. They are:

- (1) Percent of the Interstate System where Peak Hour Travel Times meet expectations; and
- (2) Percent of the non-Interstate NHS where Peak Hour Travel Times meet expectations.

**§ 490.509 Data requirements.**

- (a) Travel time data needed to calculate the measures in § 490.507 shall come from the Travel Time Data Set, as specified in § 490.103(e).

- (1) State DOTs, in coordination with MPOs, shall define reporting segments in accordance with § 490.103(f) and submit the reporting segments in accordance with § 490.103(g). Reporting segments must be contiguous so that they cover the full extent of the mainline highways of the NHS in the State.

- (2) [Reserved]

- (b) State DOTs shall use posted speed limit data to calculate travel times when data is not available in the Travel Time Data Set (data not reported, or reported as “0” or null) as specified in § 490.511(b)(1)(v).

- (c) Populations of urbanized areas shall be as identified based on the most recent U.S. Decennial Census available at the time when the State DOT Baseline Performance Period Report is due to FHWA. State DOTs and MPOs shall use this population to identify areas that are applicable to the Peak Hour Travel Time measure as specified in § 490.503.

**§ 490.511 Calculation of system performance metrics.**

- (a) Two performance metrics are required for the measures specified in § 490.507. These are:

- (1) Level of Travel Time Reliability (LOTTR)
- (2) Peak Hour Travel Time Ratio (PHTTR)

- (b) The State DOT shall calculate the LOTTR metrics for each NHS reporting segment in accordance with the following:

(1) Data sets shall be created from the Travel Time Data Set to be used to calculate the LOTTR metrics. This data set shall include, for each reporting segment, a ranked list of average travel times for all traffic ("all vehicles" in NPMRDS nomenclature), to the nearest second, for 5 minute periods of a population that:

(i) Includes travel times occurring between the hours of 6:00 a.m. and 10:00 a.m. for every weekday (Monday–

Friday) from January 1st through December 31st of the same year;

(ii) Includes travel times occurring between the hours of 10:00 a.m. and 4:00 p.m. for every weekday (Monday–Friday) from January 1st through December 31st of the same year;

(iii) Includes travel times occurring between the hours of 4:00 p.m. and 8:00 p.m. for every weekday (Monday–Friday) from January 1st through December 31st of the same year;

(iv) Includes travel times occurring between the hours of 6:00 a.m. and 8:00 p.m. for every weekend day (Saturday–Sunday) from January 1st through December 31st of the same year; and

(v) Any travel time for Travel Time segments contained within a reporting segment that are not reported, or reported as "0" or null shall be replaced with the calculated travel time for that segment, based on the segment length and posted speed limit (TT@PSL), rounded to the nearest second.

$$TT@PSL(\text{seconds}) = \frac{\text{Segment Length (miles)}}{\text{Posted Speed Limit (miles per hour)}} \times 60 \times 60$$

(2) The Normal Travel Time (50th percentile) shall be determined from each data set defined under paragraph (b)(1) of this section as the time in which 50 percent of the times in the data set are shorter in duration and 50 percent are longer in duration. The 80th percentile travel time shall be determined from the each data set defined under paragraph (b)(1) of this section as the time in which 80 percent of the times in the data set are shorter in duration and 20 percent are longer in duration. Both the Normal and 80th percentile travel times can be determined by plotting the data on a Travel Time Cumulative Probability Distribution graph or using the percentile functions available in spreadsheet and other analytical tools.

(3) Four LOTTR metrics shall be calculated for each reporting segment; one for each data set defined under paragraph (b)(1) of this section as the 80th percentile travel time divided by the 50th percentile travel time and rounded to the nearest hundredth.

(c) The State DOT shall calculate the PHTTR metric for each reporting segment that is included within an urbanized area with a population over 1,000,000 in accordance with the following:

(1) The State DOT, in coordination with the relevant MPOs, shall assign a "Desired Peak Period Travel Time," based on their operational policies for their NHS roadways, for each reporting segment for the peak period, one each for the three morning hours and three evening hours and report these to FHWA in accordance with § 490.103(g)(3).

(2) All travel times equating to speeds less than 2 mph or greater than 100 mph shall be removed from the calculation described in paragraph (c)(3) of this section.

(3) An average annual peak hour travel time for each reporting segment shall be computed for each peak hour on non-Federal holiday weekdays that includes travel times recorded from January 1st through December 31st of a calendar year. Morning peak hours for this metric shall include 6:00 to 7:00 a.m., 7:00 to 8:00 a.m., and 8:00 to 9:00 a.m. and afternoon peak hours for this measure shall include 4:00 to 5:00 p.m., 5:00 to 6:00 p.m., and 6:00 to 7:00 p.m. The average travel time for each peak hour shall be calculated for each reporting segment to the nearest whole second as the sum of the 5-minute bin segment average travel times for all traffic ("all vehicles" in NPMRDS nomenclature) occurring in the peak hour on non-Federal holiday weekdays throughout the year divided by the total count of 5-minute intervals where travel times were reported in the peak hour.

(4) The longest average annual peak hour travel time out of the 6 calculated in paragraph (c)(2) of this section shall be used to calculate the PHTTR metric for the reporting segment.

(5) The PHTTR metric shall be calculated for each reporting segment by using the longest average annual peak hour travel time as described in paragraph (c)(3) of this section divided by either the desired morning or afternoon peak hour travel time defined in paragraph (c)(1) of this section corresponding to the hour when the longest average annual peak hour travel time occurred, and rounded to the nearest hundredth.

(d) Starting in 2018 and annually thereafter, State DOTs shall report the metrics, as defined in this section, in accordance with HPMS Field Manual by June 15th of each year for the previous year's measures. Specifically, the following metrics shall be reported for each reporting segment:

(1) All reporting segments of the NPMRDS shall be referenced by NPMRDS TMC. If a State DOT elects to use, in part or in whole, the equivalent data set, all reporting segment shall be referenced by HPMS location referencing standards:

(2) The Level of Travel Time Reliability (LOTTR) metric (to the nearest hundredths) for each of the four time periods identified in paragraphs (b)(1)(i) through (iv) of this section; the corresponding 80th percentile travel times (to the nearest second); and the corresponding normal (50th percentile) travel times (to the nearest second);

(3) Peak Hour Travel Time Ratio (PHTTR) (to the nearest hundredth); peak hour travel time (to the nearest second); and the hour (6 a.m., 7 a.m., 8 a.m., 4 p.m., 5 p.m., or 6 p.m.) where the peak travel time occurred.

#### **§ 490.513 Calculation of system performance measures.**

(a) The performance measures in § 490.507 shall be calculated in accordance with this section and used by State DOTs and MPOs to carry out the Interstate System and non-Interstate NHS performance-related requirements of part 490, and by FHWA to make the significant progress determinations specified in § 490.109.

(b) The performance measure for Interstate System Travel Time Reliability specified in § 490.507(a)(1) shall be computed to the nearest tenth of a percent as follows:

$$100 \times \frac{\sum_{i=1}^R SL_i}{\sum_{i=1}^T SL_i}$$

Where,

R: Total number of Interstate System reporting segments that are exhibiting an LOTTR below 1.50 during all of the time periods identified in 490.511(b)(1)(i) through (iv);

i: Interstate System reporting segment;  
SL<sub>i</sub>: Length, to the nearest thousandth of a mile, of Interstate System reporting segment “i”;  
T: Total number of Interstate System reporting segments.

(c) The performance measure for non-Interstate NHS Travel Time Reliability specified in § 490.507(a)(2) shall be computed to the nearest tenth of a percent as follows:

$$100 \times \frac{\sum_{i=1}^R SL_i}{\sum_{i=1}^T SL_i}$$

Where,

R: Total number of non-Interstate NHS reporting segments that are exhibiting an LOTTR below 1.50 during all of the time periods identified in § 490.511(b)(1)(i) through (iv);

i: Non-Interstate NHS reporting segment;  
SL<sub>i</sub>: Length, to the nearest thousandth of a mile, of non-Interstate NHS reporting segment “i”;

T: Total number of non-Interstate NHS reporting segments

(d) The performance measure for Interstate System Peak Hour Travel Time specified in § 490.507(b)(1) shall be computed to the nearest tenth of a percent as follows:

$$100 \times \frac{\sum_{i=1}^R SL_i}{\sum_{i=1}^T SL_i}$$

Where,

R: Total number of Interstate System reporting segments that are exhibiting a PHTTR below 1.50;

i: Interstate System reporting segment in an urbanized area with a population over one million;

SL<sub>i</sub>: Length, to the nearest thousandth of a mile, of Interstate System reporting segment “i”;

T: Total number of Interstate System reporting segments in an urbanized area with a population over one million.

(e) The performance measure for non-Interstate NHS Peak Hour Travel Time specified in § 490.507(b)(2) shall be computed to the nearest tenth of a percent as follows:

$$100 \times \frac{\sum_{i=1}^R SL_i}{\sum_{i=1}^T SL_i}$$

Where,

R: Total number of non-Interstate NHS reporting segments that are exhibiting a PHTTR below 1.50;

i: Non-Interstate NHS reporting segment in an urbanized area with a population over one million;

SL<sub>i</sub>: Length, to the nearest thousandth of a mile, of non-Interstate NHS reporting segment “i”;

T: Total number of non-Interstate NHS reporting segments in an urbanized area with a population over one million.

#### ■ 4. Add Subpart F to read as follows:

### Subpart F—National Performance Management Measures to Assess Freight Movement on the Interstate System

Sec.

490.601 Purpose.

490.603 Applicability.

490.605 Definitions.

490.607 National performance management measures to assess freight movement on the Interstate System.

490.609 Data requirements.

490.611 Calculation of freight movement metrics.

490.613 Calculation of freight movement measures.

#### § 490.601 Purpose.

The purpose of this subpart is to implement the requirements of 23 U.S.C. 150(c)(6) to establish performance measures for State Departments of Transportation (State DOTs) and the Metropolitan Planning Organizations (MPOs) to use to assess the national freight movement on the Interstate System.

#### § 490.603 Applicability.

The performance measures to assess the national freight movement are applicable to the Interstate System.

#### § 490.605 Definitions.

The definitions in § 490.101 apply to this subpart.

#### § 490.607 National performance management measures to assess freight movement on the Interstate System.

There are two performance measures to assess freight movement on the Interstate System. They are:

(a) Percent of the Interstate System Mileage providing for Reliable Truck Travel Times; and

(b) Percent of the Interstate System Mileage Uncongested.

#### § 490.609 Data requirements.

(a) Travel time data needed to calculate the measures in § 490.607 shall come from the Travel Time Data Set, as specified in § 490.103(e).

(b) State DOTs, in agreement with MPOs, shall define reporting segments in accordance with § 490.103(f) and submit the reporting segments in accordance with § 490.103(g). Reporting segments must be contiguous so that

they cover the full extent of the directional mainline highways of the Interstate in the State.

(c) When truck travel times are not available in the Travel Time Data Set (data not reported, or reported as “0” or null) as specified in § 490.611(b)(1)(ii) for a given 5 minute interval State DOTs shall replace the missing travel time as follows:

(1) Replace the missing value with an observed travel time that represents all traffic on the roadway during the same 5 minute interval (“all vehicles” in NPMRDS nomenclature) provided this travel time is associated with travel speeds that are less than the posted speed limit; or

(2) Replace the missing value with the travel time that would have occurred while traveling at the posted speed limit.

#### § 490.611 Calculation of freight movement metrics.

(a) Two performance metrics are required for the measures specified in § 490.607. These are:

(1) Truck Travel Time Reliability.

(2) Average Truck Speed.

(b) The State DOT shall calculate the Truck Travel Time Reliability metric for each Interstate System reporting segment in accordance with the following:

(1) A truck travel time data set shall be created from the Travel Time Data Set to be used to calculate the Truck Travel Time Reliability metric. This data set shall include, for each reporting segment, a ranked list of average truck travel times, to the nearest second, for 5 minute periods of a 24 hour period for an entire calendar year that:

(i) Includes truck travel times occurring for all hours of every day and for every 24-hour period from January 1st through December 31st of the same year; and

(ii) Any truck travel times for Travel Time Segments contained within a reporting segment that are not reported, or reported as “0” or null shall be replaced with an observed travel time that represents all traffic on the roadway during the same 5 minute interval (“all vehicles” in NPMRDS nomenclature) provided this travel time is associated with travel speeds that are less than the posted speed limit. In all other cases the truck travel time shall be replaced with a calculated truck travel time for that segment, based on the segment length and posted speed limit (TTT@PSL), rounded to the nearest second.



$$TTT@PSL(seconds) = \frac{Segment\ Length\ (miles)}{Posted\ Speed\ Limit\ (miles\ per\ hour)} \times 60 \times 60$$

(2) The Normal Truck Travel Time (50th percentile) shall be determined from the truck travel time data set defined under paragraph (b)(1) of this section as the time in which 50 percent of the times in the data set are shorter in duration and 50 percent are longer in duration. The 95th percentile truck travel time shall be determined from the truck travel time data set defined under paragraph (b)(1) of this section as the time in which 95 percent of the times in the data set are shorter in duration. Both the Normal and 95th percentile truck travel times can be determined by

plotting the data on a Travel Time Cumulative Probability Distribution graph or using the percentile functions available in spreadsheet and other analytical tools.

(3) The Truck Travel Time Reliability metric shall be calculated for each Interstate System reporting segment as the 95th percentile truck travel time divided by the Normal Truck Travel Time (50th percentile truck travel time), rounded to the nearest hundredth.

(c) The State DOT shall calculate the Average Truck Speed metric for each Interstate System reporting segment, in accordance with the following:

(1) Any truck travel times for the travel time segments contained within a reporting segment that are not reported, or reported as "0" or null shall be replaced with an observed travel time that represents all traffic on the roadway during the same 5 minute interval ("all vehicles" in NPMRDS nomenclature) provided this travel time is associated with travel speeds that are less than the posted speed limit. In all other cases the truck travel time shall be with the truck travel time, to the nearest second, at posted speed limit (TTT@PSL) for that segment.

$$TTT@PSL(seconds) = \frac{Segment\ Length\ (miles)}{Posted\ Speed\ Limit\ (miles\ per\ hour)} \times 60 \times 60$$

(2) The Average Truck Speed shall be calculated for each reporting segment as follows:

$$Average\ Truck\ Speed\ (s) = \frac{\left[ \sum_{b=1}^T \frac{Segment\ Length\ (s)}{Truck\ Travel\ Time_b} \right]}{T} \times 60 \times 60$$

Where,

$b$  = a 5-minute time interval of a travel time reporting segment "s;"

$s$  = a travel time reporting segment;

$T$  = total number of time intervals in everyday in a full calendar year;

$Segment\ Length\ (s)$  = length of reporting segment "s," to the nearest one thousandth of a mile;

$Truck\ Travel\ Time_b$  = travel time of trucks, for time interval "b" in the Travel Time Data Set or TTT@PSL for the reporting segment  $s$  described in paragraph (1), to the nearest second;

$Average\ Truck\ Speed\ (s)$  = average annual speed of trucks travelling through the reporting segment "s," to the nearest hundredth mile per hour.

(d) Starting in 2018 and annually thereafter, State DOTs shall report the metrics, as defined in this section, in accordance with HPMS Field Manual by June 15th of each year for the previous year's measures. Specifically, the following metrics shall be reported for each reporting segment:

(1) All reporting segments of the NPMRDS shall be referenced by NPMRDS TMC. If a State DOT elects to use, in part or in whole, the equivalent data set, all reporting segment shall be

referenced by HPMS location referencing standards:

(2) Truck Travel Time Reliability metric (to the nearest hundredth), including the 95th percentile truck travel time (to the nearest second) and normal (50th percentile) truck travel time (to the nearest second);

(3) Average Truck Speed metric (to the nearest hundredth mile per hour).

#### **§ 490.613 Calculation of freight movement measures.**

(a) The performance measures in § 490.607 shall be calculated in accordance with this section and used by State DOTs and MPOs to carry out the Freight Movement on the Interstate System related requirements of part 490, and by FHWA to report on performance of the Interstate System.

(b) The performance measure for the Percent of the Interstate System Mileage providing for Reliable Truck Travel Times specified in § 490.607(a) shall be computed to the nearest tenth of a percent as follows:

$$100 \times \frac{\sum_{a=1}^R SL_a}{\sum_{i=1}^T SL_i}$$

Where,

$a$ : An Interstate System reporting segment exhibiting Reliable Truck Travel Times. Reliable Truck Travel Times for a reporting segment is where calculated value of metric for the reporting segment, in § 490.611(b)(3), is below 1.50;

$SL_a$ : Segment length, to the nearest thousandth of a mile, of Interstate System reporting segment "a;"

$R$ : A total number of Interstate System reporting segments that are exhibiting Reliable Truck Travel Times ( $R \in T$ );

$i$ : An Interstate System reporting segment;

$SL_i$ : Segment length, to the nearest thousandth of a mile, of Interstate System reporting segment "i;" and

$T$ : A total number of Interstate System reporting segments.

(c) The performance measure for the Percent of the Interstate System Mileage Uncongested as specified in § 490.607(b) shall be computed to the nearest tenth of a percent as follows:

$$100 \times \frac{\sum_{g=1}^U SL_g}{\sum_{i=1}^T SL_i}$$

Where,

$g$ : An uncongested Interstate System reporting segment. An uncongested reporting segment is where calculated

Average Truck Speed for the reporting segment, in § 490.611(c)(2), is greater than 50.00 mph;

*SL<sub>g</sub>*: Segment length, to the nearest thousandth of a mile, of Interstate System reporting segment “g.”

U: A total number of uncongested Interstate System reporting segments ();

i: An Interstate System reporting segment;

*SL<sub>i</sub>*: Length, to the nearest thousandth of a mile, of Interstate System reporting segment “i,” and

T: Total number of Interstate System reporting segments.

■ 5. Add Subpart G to read as follows:

**Subpart G—National Performance Management Measure for Assessing the Congestion Mitigation and Air Quality Improvement Program—Traffic Congestion**

Sec.

490.701 Purpose.

490.703 Applicability.

490.705 Definitions.

490.707 National performance management measure for traffic congestion.

490.709 Data requirements.

490.711 Calculation of congestion metric.

490.713 Calculation of congestion measure.

**§ 490.701 Purpose.**

The purpose of this subpart is to implement the requirements of 23 U.S.C. 150(c)(5)(A) to establish performance measures for State Departments of Transportation (State DOTs) and the Metropolitan Planning Organizations (MPOs) to use in assessing traffic congestion.

**§ 490.703 Applicability.**

The performance measure is applicable to all of the National Highway System in urbanized areas with a population over one million that are, in all or part, designated as nonattainment or maintenance areas for ozone (O<sub>3</sub>), carbon monoxide (CO), or particulate matter (PM<sub>10</sub> and PM<sub>2.5</sub>) National Ambient Air Quality Standards (NAAQS).

**§ 490.705 Definitions.**

All definitions in § 490.101 apply to this subpart. Unless otherwise specified, the following definitions apply in this subpart:

*Excessive delay* means the extra amount of time spent in congested conditions defined by speed thresholds that are lower than a normal delay threshold. For the purposes of this rule, the speed threshold is 35 miles per hour

(mph) on Interstates (Functional Class 1) and other freeways and expressways (Functional Class 2) and 15 mph on other principal arterials (Functional Class 3) and other roads with lower functional classifications that are included in the NHS, as defined by FHWA: HPMS Functional Classifications.<sup>1</sup>

**§ 490.707 National performance management measure for traffic congestion.**

The performance measure to assess traffic congestion for the purpose of carrying out the CMAQ program, is Annual Hours of Excessive Delay Per Capita.

**§ 490.709 Data requirements.**

(a) Travel time data needed to calculate the measure in § 490.707 shall come from the Travel Time Data Set, as specified in § 490.103(e).

(b) State DOTs, in coordination with MPOs, shall define reporting segments in accordance with § 490.103(f) and submit the reporting segments in accordance with § 490.103(g). Reporting segments must be contiguous so that they cover the full extent of the directional mainline highways of the NHS in the urbanized area(s).

(c) State DOTs shall develop hourly traffic volume data for each reporting segment as follows:

(1) State DOTs shall measure or estimate hourly traffic volumes for each day of the reporting year by using either paragraph (c)(1)(i) or (ii) of this section.

(i) State DOTs may use hourly traffic volume counts collected by continuous count stations and apply them to multiple reporting segments, or

(ii) State DOTs may use Annual Average Daily Traffic (AADT) reported to the HPMS to estimate hourly traffic volumes when no hourly volume counts exist. In these cases the AADT data used should be the most recently available, but no more than two years older than the reporting period (*i.e.*, if reporting for calendar year 2018, AADT should be from 2016 or 2017) and should be split to represent the appropriate direction of travel of the reporting segment.

(2) State DOTs shall assign hourly traffic volumes to each reporting segment by hour (*e.g.*, between 8:00 a.m. and 8:59 a.m.; between 9:00 a.m. and 9:59 a.m.).

(3) State DOTs shall report the methodology they use to develop hourly

traffic volume estimates to FHWA no later than 60 days prior to the submittal of the first Baseline Performance Period Report.

(4) If a State DOT elects to change the methodology it reported under paragraph (c)(3) of this section, then the State DOT shall submit the changed methodology no later than 60 days prior to the submittal of next State Biennial Performance Report required in § 490.107(b).

(d) Populations of urbanized areas shall be as identified based on the most recent U.S. Decennial Census available at the time when the State DOT Baseline Performance Period Report is due to FHWA. This population shall be used for the duration of the performance period to calculate the performance measure as specified in § 490.713.

(e) Nonattainment and maintenance areas shall be identified based on the U.S. Environmental Protection Agency’s designation of the area under the NAAQS at the time when the State DOT Baseline Performance Period Report is due to FHWA. These designations shall be used for the duration of the performance period.

**§ 490.711 Calculation of congestion metric.**

(a) The performance metric required to calculate the measure specified in § 490.707 is Total Excessive Delay (vehicle-hours). The following paragraphs explain how to calculate this metric.

(b) State DOTs shall use the following data to calculate the Total Excessive Delay (vehicle-hours) metric:

(1) Travel times of all traffic (“all vehicles” in NPMRDS nomenclature) during each five minute interval for all applicable reporting segments in the Travel Time Data Set occurring for all hours of every day and for every 24-hour period from January 1st through December 31st of the same year;

(2) The length of each applicable reporting segment, reported as required under § 490.709(b); and

(3) Hourly volume estimation for all days and for all reporting segments where excessive delay is measured, as specified in § 490.709(c).

(c) The State DOT shall calculate the “excessive delay threshold travel time” for all applicable travel time segments as follows:

<sup>1</sup> Highway Functional Classification Concepts, Criteria and Procedures: [http://www.fhwa.dot.gov/planning/processes/statewide/related/highway\\_functional\\_classifications/fcauab.pdf](http://www.fhwa.dot.gov/planning/processes/statewide/related/highway_functional_classifications/fcauab.pdf).

### Excessive Delay Threshold Travel Time (s)

$$= \left( \frac{\text{Travel Time Segment Length (s)}}{\text{Threshold Speed (s)}} \right) \times 3,600$$

Where:

*Excessive Delay Threshold Travel Time(s)* =  
The time of travel, to the nearest whole second, to traverse the Travel Time Segment at which any longer measured

travel times would result in excessive delay for the travel time segment "s;"  
*Travel Time Segment Length(s)* = Total length of travel time segment to the nearest thousandth of a mile for travel time reporting segment "s;" and

*Threshold Speed(s)* = The speed of travel at which any slower measured speeds would result in excessive delay for travel time reporting segment "s."

### Threshold Speed (s)

$$= \begin{cases} 35 \text{ mph for Interstates/freeways/expressways} \\ 15 \text{ mph for principal arterials and all other NHS roads} \end{cases}$$

(d) State DOTs shall determine the "excessive delay" for each five minute bin of each reporting segment for every hour and every day in a calendar year as follows:

(1) The travel time segment delay (RSD) shall be calculated to the nearest whole second as follow:

$$RSD(s)_b = \text{Travel Time}(s)_b - \text{Excessive Delay Threshold Travel Time}(s)$$

and

$$RSD(s)_b \leq 300 \text{ seconds}$$

Where:

*RSD(s)<sub>b</sub>* = travel time segment delay, calculated to the nearest whole second, for a five minute bin "b" of travel time reporting segment "s" for in a day in a calendar year. *RSD(s)<sub>b</sub>* not to exceed 300 seconds;

*Travel Time(s)<sub>b</sub>* = a measured travel time, to the nearest second, for 5-minute time bin "b" recorded for travel time reporting segment "s;"

*Excessive Delay Threshold Travel Time(s)* = The maximum amount of time, to the nearest second, for a vehicle to traverse through travel time segment "s" before

excessive delay would occur, as specified in § 490.711(c);  
*b* = a five minute bin of a travel time reporting segment "s;" and  
*s* = a travel time reporting segment.

(2) Excessive delay, the additional amount of time to traverse a travel time segment in a five minute bin as compared to the time needed to traverse the travel time segment when traveling at the excessive delay travel speed threshold, shall be calculated to the nearest thousandths of an hour as follows:

$$\text{Excessive Delay}(s)_b = \begin{cases} \frac{RSD(s)_b}{3,600} \text{ when } RSD(s)_b \geq 0 \\ \text{or} \\ 0 \text{ when } RSD(s)_b < 0 \end{cases}$$

Where:

*Excessive delay(s)<sub>b</sub>* = Excessive delay, calculated to the nearest thousandths of an hour, for five minute bin "b" of travel time reporting segment "s;"

*RSD(s)<sub>b</sub>* = the calculated travel time reporting segment delay for five minute bin "b" of a travel time reporting segment "s;" as described in paragraph (1) of this section;

*b* = a five minute bin of a travel time reporting segment "s;" and

*s* = a travel time reporting segment.

(e) State DOTs shall use the hourly traffic volumes as described in § 490.709(c) to calculate the Total Excessive Delay (vehicles-hours) metric for each reporting segment as follows:

### Total Excessive Delay(s)

$$= \sum_{d=1}^{TD} \left\{ \sum_{h=1}^{TH} \left[ \sum_{b=1}^{TB} \left( [\text{Excessive Delay}(s)_{b,h,d}] \times \left( \frac{\text{hourly volume}(s)}{12} \right)_{h,d} \right) \right] \right\}_b$$

Where:

*Total Excessive Delay (in vehicle-hours)* = the sum of the excessive delay, to the nearest

thousandths, for all traffic traveling through single travel time reporting



segment on NHS within an urbanized area, specified in § 490.703, accumulated over the full reporting year;  
*s* = a travel time reporting segment;  
*d* = a day of the reporting year;  
*TD* = total number of days in the reporting year;

*h* = single hour interval of the day where the first hour interval is 12:00 a.m. to 12:59 a.m.;  
*TH* = total number of hour intervals in day “*h*,”  
*b* = 5-minute bin for hour interval “*h*,”  
*TB* = total number of 5-minute bins where travel times are recorded in the travel time data set for hour interval “*h*,”

*Excessive Delay(s)<sub>b,h,d</sub>* = calculated excessive travel time, in hundredths of an hour, for 5 minute bin (*b*), hour interval (*h*), day (*d*), and travel time segment (*s*), as described in paragraph d(2) of this section; and

$$\left( \frac{\text{hourly volume}(s)}{12} \right)_{h,d,s} = \text{hourly traffic volume, to the nearest tenth, for hour}$$

interval “*h*” and day “*d*” that corresponds to 5-minute bin “*b*” and travel time reporting segment “*s*” divided by 12. For example, the 9:05 a.m. to 9:10 a.m. minute bin would be assigned one twelfth of the hourly traffic volume for the 9:00 a.m. to 9:59 a.m. hour on the roadway in which travel time segment is included.

(f) Starting in 2018 and annually thereafter, State DOTs shall report Total Excessive Delay (vehicle-hours) metric (to the nearest one hundredth hour) in accordance with HPMS Field Manual by June 15th of each year for the previous year’s measures. The Total Excessive

Delay (vehicle-hours) metric shall be reported for each reporting segment. All reporting segments of the NPMRDS shall be referenced by NPMRDS TMC. If a State DOT elects to use, in part or in whole, the equivalent data set, all reporting segment shall be referenced by HPMS location referencing standards.

#### § 490.713 Calculation of congestion measure.

(a) The performance measure in § 490.707 shall be computed in accordance with this section and shall be used by State DOTs and MPOs to

carry out CMAQ Traffic Congestion performance-related requirements of part 490.

(b) The performance measure for CMAQ Traffic Congestion specified in § 490.707, Annual Hours of Excessive Delay Per Capita, shall be computed to the nearest hundredth, and by summing the “Total Excessive Delay (vehicle-hours)” metrics of all reporting segments in each of the urbanized area, specified in § 490.703, and dividing it by the population of the urbanized area to produce the measure. The equation for calculating the measure is as follows:

#### Annual Hours of Excessive Delay per Capita

$$= \frac{\sum_{s=1}^T \text{Total Excessive Delay}(s)}{\text{Total Population}}$$

Where:

*Annual Hours of Excessive Delay per Capita* = the cumulative hours of excessive delay, to the nearest tenth, experienced by all traffic traveling through all reporting segments in the applicable urbanized area for the full reporting calendar year.

*s* = travel time reporting segment within an urbanized area, specified in § 490.703;

*T* = total number of travel time reporting segments in the applicable urbanized area;

*Total Excessive Delay(s)* = total hours of excessive delay in § 490.711(e) for all traffic traveling through travel time reporting segment “*s*” during the reporting year (as defined in § 490.711(f));

*Total Population* = the total population in the applicable urbanized area as reported by the most recent U.S. Decennial Census.

(c) Calculation for the measure, described in this section, and target establishment for the measure shall be phased-in under the requirements in §§ 490.105(e)(8)(vi) and 490.105(f)(4)(vi).

■ 8. Add Subpart H to read as follows:

#### Subpart H—National Performance Management Measures to Assess the Congestion Mitigation and Air Quality Improvement Program—On-Road Mobile Source Emissions

Sec.

490.801 Purpose.

490.803 Applicability.

490.805 Definitions.

490.807 National performance management measure for assessing on-road mobile source emissions for the purposes of the Congestion Mitigation and Air Quality Improvement Program.

490.809 Data requirements.

490.811 Calculation of emissions metric.

490.813 Calculation of emissions measure.

#### § 490.801 Purpose.

The purpose of this subpart is to implement the requirements of 23 U.S.C. 150(c)(5)(B) to establish performance measures for State Departments of Transportation (State DOTs) and the Metropolitan Planning Organizations (MPOs) to use in assessing on-road mobile source emissions.

#### § 490.803 Applicability.

(a) The on-road mobile source emissions performance measure is applicable to all projects financed with funds from the 23 U.S.C. 149 CMAQ program apportioned to State DOTs in areas designated as nonattainment or maintenance for ozone (O<sub>3</sub>), carbon monoxide (CO), or particulate matter (PM<sub>10</sub> and PM<sub>2.5</sub>) National Ambient Air Quality Standards (NAAQS).

(b) This performance measure does not apply to States and MPOs that do not contain any portions of nonattainment or maintenance areas for the criteria pollutants identified in paragraph (a) of this section.

#### § 490.805 Definitions.

All definitions in § 490.101 apply to this subpart. Unless otherwise specified in this part, the following definitions apply in this part:

*Donut areas* mean geographic areas outside a metropolitan planning area boundary, but inside the boundary of a nonattainment or maintenance area that contains a part of any metropolitan area(s). These areas are not isolated

rural nonattainment and maintenance areas.

*Isolated rural nonattainment and maintenance areas* mean areas that do not contain or are not part of any metropolitan planning area as designated under the transportation planning regulations. Isolated rural areas do not have federally required metropolitan transportation plans or Transportation Improvement Plans (TIPs) and do not have projects that are part of the emissions analysis of any MPO's metropolitan transportation plan or TIP. Projects in such areas are instead included in statewide transportation improvement programs. These areas are not donut areas.

*On-road mobile source* means, within this rulemaking, emissions created by all projects and sources financed with funds from the 23 U.S.C. 149 CMAQ program.

**§ 490.807 National performance management measure for assessing on-road mobile source emissions for the purposes of the Congestion Mitigation and Air Quality Improvement Program.**

The performance measure for the purpose of carrying out the CMAQ Program and for State DOTs to use to assess on-road mobile source emissions is, "Total Emissions Reduction", which is the 2-year and 4-year cumulative reported emission reductions, for all projects funded by CMAQ funds, of each criteria pollutant and applicable precursors (PM<sub>2.5</sub>, PM<sub>10</sub>, CO, VOC, and NO<sub>x</sub>) under the CMAQ program for which the area is designated nonattainment or maintenance.

**§ 490.809 Data requirements.**

(a) The data needed to calculate the Total Emission Reduction measure shall come from the CMAQ Public Access System and includes:

- (1) The applicable nonattainment or maintenance area;
- (2) The applicable MPO; and
- (3) The emissions reduction estimated for each CMAQ funded project for each of the applicable criteria pollutants and their precursors for which the area is nonattainment or maintenance.

(b) The State DOT shall:

(1) Enter project information into the CMAQ project tracking system for each CMAQ project funded in the previous fiscal year by March 1st of the following fiscal year; and

(2) Extract the data necessary to calculate the on-road mobile source emissions measures as it appears in the CMAQ Public Access System on July 1st for projects obligated in the prior fiscal year.

(c) Nonattainment and maintenance areas shall be identified based on the effective date of U.S. Environmental Protection Agency's designations under the NAAQS in 40 CFR part 81 at the time when the State DOT Baseline Performance Period Report is due to FHWA. These designations shall be used for the duration of the performance period.

**§ 490.811 Calculation of emissions metric.**

(a) The metric to calculate the Total Emission Reductions measure is the conversion of Emission Reductions from kg/day to short tons per year.

(b) The Annual Tons of Emission Reductions that are predicted for each

applicable project reported to the CMAQ Public Access System for each criteria pollutant or precursor for one year shall be defined as follows:

$$\text{Annual Tons of Emission Reductions}(p)_i = \text{Reductions}(p)_i \times 0.4026$$

Where:

$p$  = criteria pollutant or precursor: PM<sub>2.5</sub>, PM<sub>10</sub>, CO, VOC, or NO<sub>x</sub>;

$i$  = a project that is obligated for CMAQ funding for the first time;

$\text{Reductions}/p$  = estimated daily emissions reductions for a criteria pollutant or a precursor in a Federal fiscal year for which the project is obligated for CMAQ funding for the first time. This is reported in kg/day, in the first year the project is operational, to the nearest one thousandths; and

$\text{Annual Tons of Emission Reductions}(p)_i$  = total annual short tons, to the nearest one thousandths, of reduced emissions for a criteria pollutant or an applicable precursor "p" in the first year the project is obligated.

**§ 490.813 Calculation of emissions measure.**

(a) The Total Emission Reductions performance measure specified in § 490.807 shall be calculated in accordance with this section and used by State DOTs and MPOs to carry out CMAQ On-Road Mobile Source Emissions performance-related requirements of part 490.

(b) The Total Emission Reductions for each of the criteria pollutant or applicable precursor for all projects reported to the CMAQ Public Access System shall be calculated to the nearest one thousandths, as follows:

$$\text{Total Emission Reduction}(p)$$

$$= \sum_{i=1}^T \text{Annual Tons of Emission Reductions}(p)_i$$

Where:

$i$  = applicable projects reported in the CMAQ Public Access System for the first 2 Federal fiscal years of a performance period and for the entire performance period, as described in in § 490.105(e)(4)(i)(B);

$p$  = criteria pollutant or applicable precursor: PM<sub>2.5</sub>, PM<sub>10</sub>, CO, VOC, or NO<sub>x</sub>;

$\text{Annual Tons of Emission Reductions}(p)_i$  = specified metric in § 490.811(b);

$T$  = total number of applicable projects reported to the CMAQ Public Access System for the first 2 Federal fiscal years of a performance period and for the entire performance period, as described in § 490.105(e)(4)(i)(B); and

$\text{Total Emission Reductions}(p)$  = cumulative reductions in emissions over 2 and 4 Federal fiscal years, total annual short tons, to the nearest one thousandths, of reduced emissions for criteria pollutant or precursor "p".

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person in the Dockets Office (see the **ADDRESSES** section for the address and phone number) between 9:00 a.m. and 5:00 p.m., Monday through Friday, except federal holidays. An informal docket may also be examined during normal business hours at the Federal Aviation Administration, Air Traffic Organization, Central Service Center, Operations Support Group, 10101 Hillwood Parkway, Fort Worth, TX 76177.

#### Availability and Summary of Documents Proposed for Incorporation by Reference

This document proposes to amend FAA Order 7400.11B, *Airspace Designations and Reporting Points*, dated August 3, 2017, and effective September 15, 2017. FAA Order 7400.11B is publicly available as listed in the **ADDRESSES** section of this document. FAA Order 7400.11B lists Class A, B, C, D, and E airspace areas, air traffic service routes, and reporting points.

#### The Proposal

The FAA is proposing an amendment to Title 14 Code of Federal Regulations (14 CFR) part 71 by:

Modifying Class E airspace extending upward from 700 feet above the surface to within a 6.4-mile radius (reduced from a 7-mile radius) of Fort Scott Municipal Airport, Fort Scott, KS; removing the Fort Scott NDB from the legal description; and removing the extension north of the NDB; and

Modifying Class E airspace extending upward from 700 feet above the surface to within a 6.5-mile radius (reduced from a 7.6-mile radius) of Phillipsburg Municipal Airport, Phillipsburg, KS; removing the Phillipsburg NDB from the legal description; and removing the extension southeast of the NDB.

Airspace reconfiguration is necessary due to the decommissioning of the Fort Scott NDB and the Phillipsburg NDB, the cancellation of the associated instrument approach procedures, and to bring the airspace in compliance with FAA Order 7400.2L, *Procedures for Handling Airspace Matters*. Controlled airspace is necessary for the safety and management of standard instrument approach procedures for IFR operations at these airports.

Class E airspace designations are published in paragraph 6005 of FAA Order 7400.11B, dated August 3, 2017, and effective September 15, 2017, which is incorporated by reference in 14 CFR 71.1. The Class E airspace designations listed in this document will be published subsequently in the Order.

#### Regulatory Notices and Analyses

The FAA has determined that this proposed regulation only involves an established body of technical regulations for which frequent and routine amendments are necessary to keep them operationally current, is non-controversial and unlikely to result in adverse or negative comments. It, therefore: (1) Is not a “significant regulatory action” under Executive Order 12866; (2) is not a “significant rule” under DOT Regulatory Policies and Procedures (44 FR 11034; February 26, 1979); and (3) does not warrant preparation of a regulatory evaluation as the anticipated impact is so minimal. Since this is a routine matter that will only affect air traffic procedures and air navigation, it is certified that this proposed rule, when promulgated, would not have a significant economic impact on a substantial number of small entities under the criteria of the Regulatory Flexibility Act.

#### Environmental Review

This proposal will be subject to an environmental analysis in accordance with FAA Order 1050.1F, “Environmental Impacts: Policies and Procedures” prior to any FAA final regulatory action.

#### List of Subjects in 14 CFR Part 71

Airspace, Incorporation by reference, Navigation (air).

#### The Proposed Amendment

Accordingly, pursuant to the authority delegated to me, the Federal Aviation Administration proposes to amend 14 CFR part 71 as follows:

#### PART 71—DESIGNATION OF CLASS A, B, C, D, AND E AIRSPACE AREAS; AIR TRAFFIC SERVICE ROUTES; AND REPORTING POINTS

■ 1. The authority citation for 14 CFR part 71 continues to read as follows:

**Authority:** 49 U.S.C. 106(f), 106(g); 40103, 40113, 40120; E.O. 10854, 24 FR 9565, 3 CFR, 1959–1963 Comp., p. 389.

##### § 71.1 [Amended]

■ 2. The incorporation by reference in 14 CFR 71.1 of FAA Order 7400.11B, *Airspace Designations and Reporting Points*, dated August 3, 2017, and effective September 15, 2017, is amended as follows:

*Paragraph 6005 Class E Airspace Areas Extending Upward From 700 Feet or More Above the Surface of the Earth.*

\* \* \* \* \*

**ACE KS E5 Fort Scott, KS [Amended]**  
 Fort Scott Municipal Airport, KS

(Lat. 37°47′54″ N., long. 94°46′10″ W.)

That airspace extending upward from 700 feet above the surface within a 6.4-mile radius of Fort Scott Municipal Airport.

\* \* \* \* \*

#### ACE KS E5 Phillipsburg, KS [Amended]

Phillipsburg Municipal Airport, KS  
 (Lat. 39°44′09″ N., long. 99°19′02″ W.)

That airspace extending upward from 700 feet above the surface within a 6.5-mile radius of Phillipsburg Municipal Airport.

Issued in Fort Worth, Texas, on September 27, 2017.

**Wayne Eckenrode,**

*Acting Manager, Operations Support Group,  
 ATO Central Service Center.*

[FR Doc. 2017–21362 Filed 10–4–17; 8:45 am]

**BILLING CODE 4910–13–P**

## DEPARTMENT OF TRANSPORTATION

### Federal Highway Administration

#### 23 CFR Part 490

[Docket No. FHWA–2017–0025]

RIN 2125–AF76

#### National Performance Management Measures; Assessing Performance of the National Highway System, Freight Movement on the Interstate System, and Congestion Mitigation and Air Quality Improvement Program

**AGENCY:** Federal Highway Administration (FHWA), Department of Transportation (DOT).

**ACTION:** Notice of proposed rulemaking (NPRM).

**SUMMARY:** This NPRM follows a series of related rules that established a set of performance measures for State departments of transportation (State DOT) and Metropolitan Planning Organizations (MPO) to use as required by Moving Ahead for Progress in the 21st Century Act (MAP–21) and the Fixing America’s Surface Transportation (FAST) Act. In the last of that series of rules, published on January 18, 2017, FHWA established a measure on the percent change in carbon dioxide (CO<sub>2</sub>) emissions from the reference year 2017, generated by on-road mobile sources on the National Highway System (NHS) (also referred to as the Greenhouse Gas (GHG) measure). Through this NPRM, FHWA proposes to repeal the GHG measure.

**DATES:** Comments must be received on or before November 6, 2017. Late comments will be considered to the extent practicable.

**ADDRESSES:** You may submit comments identified by the docket number



FHWA–2017–0025 by any one of the following methods:

*Fax:* 1–202–493–2251;

*Mail:* U.S. Department of Transportation, Docket Operations, M–30, West Building Ground Floor, Room W12–140, 1200 New Jersey Avenue SE., Washington, DC 20590;  
*Hand Delivery:* U.S. Department of Transportation, Docket Operations, West Building Ground Floor, Room W12–140, 1200 New Jersey Avenue SE., Washington, DC 20590, between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays; or electronically through the Federal eRulemaking Portal: <http://www.regulations.gov>. Follow the online instructions for submitting comments.

*Instructions:* All submissions must include the agency name, docket name and docket number or Regulatory Identifier Number (RIN) for this rulemaking (2125–AF76). In accordance with 5 U.S.C. 553(c), DOT solicits comments from the public to better inform its rulemaking process. The DOT posts these comments, without edit, including any personal information the commenter provides, to [www.regulations.gov](http://www.regulations.gov), as described in the system of records notice (DOT/ALL–14 FDMS), which can be reviewed at [www.dot.gov/privacy](http://www.dot.gov/privacy).

*Docket:* For access to the docket to read background documents or comments received, go to <http://www.regulations.gov> at any time or to U.S. Department of Transportation, Docket Operations, M–30, West Building Ground Floor, Room W12–140, 1200 New Jersey Avenue SE., Washington, DC 20590, between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays.

**FOR FURTHER INFORMATION CONTACT:** For technical information: Susanna Hughes Reck, Office of Infrastructure, (202) 366–1548; for legal information: Anne Christenson, Office of Chief Counsel, (202) 366–1356, Federal Highway Administration, 1200 New Jersey Avenue SE., Washington, DC 20590. Office hours are from 8 a.m. to 4:30 p.m. ET, Monday through Friday, except Federal holidays.

#### **SUPPLEMENTARY INFORMATION:**

##### **Electronic Access and Filing**

A copy of the NPRM, all comments received, and all background material may be viewed online at <http://www.regulations.gov>. Electronic retrieval help and guidelines are available on the Web site. It is available 24 hours each day, 365 days each year. An electronic copy of this document may also be downloaded from the Office

of the Federal Register’s Web site at <http://www.ofr.gov> and the Government Publishing Office’s Web site at <http://www.gpo.gov>.

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#### **I. Executive Summary**

##### *A. Purpose of the Regulatory Action*

The MAP–21<sup>1</sup> (Pub. L. 112–141) transforms the Federal-aid highway program by establishing new requirements for performance management to ensure the most efficient investment of Federal transportation funds. The FAST Act<sup>2</sup> (Pub. L. 114–94) continued these requirements. Performance management increases the accountability and transparency of the Federal-aid highway program and provides a framework to support improved investment decisionmaking through a focus on performance outcomes for key national transportation goals.

As part of this mandate, FHWA issued three related national performance management measure rules<sup>3 4 5</sup> that

<sup>1</sup> Moving Ahead for Progress in the 21st Century Act (MAP–21): <https://www.gpo.gov/fdsys/pkg/PLAW-112publ141/html/PLAW-112publ141.htm>.

<sup>2</sup> Fixing America’s Surface Transportation (FAST) Act: <https://www.gpo.gov/fdsys/pkg/PLAW-114publ94/html/PLAW-114publ94.htm>.

<sup>3</sup> First performance measure final rule: “National Performance Management Measures: Highway Safety Improvement Program” (RIN 2125–AF49):

established a set of performance measures for State DOTs and MPOs to use to assess performance. In these rules, FHWA established performance measures in 12 areas<sup>6</sup> generalized as follows: (1) Serious injuries per vehicle mile traveled (VMT); (2) fatalities per VMT; (3) number of serious injuries; (4) number of fatalities; (5) pavement condition on the Interstate System; (6) pavement condition on the non-Interstate NHS; (7) bridge condition on the NHS; (8) performance of the Interstate System; (9) performance of the non-Interstate NHS; (10) freight movement on the Interstate System; (11) traffic congestion; and (12) on-road mobile source emissions.

One of the measures FHWA created to assess the performance of the NHS under the National Highway Performance Program (NHPP) is Percent Change in Tailpipe Carbon Dioxide (CO<sub>2</sub>) Emissions on the NHS from the Calendar Year 2017 (also referred to as the GHG measure). It was created to advance a policy preference of the prior Administration. It would be calculated using data on fuel use and VMT. The FHWA received a high volume of comments both in support of and opposed to this measure in response to the third NPRM. This measure became effective on DATE, 2017, at 82 FR CITE. After further consideration and review of DOT policy, as well as the statutory provisions, the DOT is proposing to repeal the requirement. This rulemaking provides additional opportunity for public comment and submission of information that will aid FHWA in making this determination.

##### *B. Costs*

As part of the rulemaking that was finalized in January 2017, FHWA estimated the incremental costs associated with the new requirements for a GHG Measure that represented a change to current practices of DOT, State DOTs, and MPOs. The FHWA

<https://www.gpo.gov/fdsys/pkg/FR-2016-03-15/pdf/2016-05202.pdf>.

<sup>4</sup> Second performance measure final rule: “National Performance Management Measures: Assessing Pavement Condition for the National Highway Performance Program and Bridge Condition for the National Highway Performance Program” (RIN 2125–AF53): <https://www.gpo.gov/fdsys/pkg/FR-2017-01-18/pdf/2017-00550.pdf>.

<sup>5</sup> Third performance measure final rule: “National Performance Management Measures: Assessing Performance of the National Highway System, Freight Movement on the Interstate System, and Congestion Mitigation and Air Quality Improvement Program” (RIN 2125–AF54): <https://www.gpo.gov/fdsys/pkg/FR-2017-01-18/pdf/2017-00681.pdf>.

<sup>6</sup> These areas are listed within 23 U.S.C. 150(c), which requires the Secretary to establish measures to assess performance or condition.

derived the costs of the new requirements by assessing the additional capital needed and the expected increase in the level of labor effort for FHWA, State DOTs, and MPOs to calculate the measure and establish and report GHG measure targets. To develop this estimate, FHWA sought opinions from subject matter experts (SME). Cost estimates were developed based on information received from SMEs. To

estimate costs, FHWA multiplied the level of effort, expressed in labor hours, with a corresponding loaded wage rate that varied by the type of laborer needed to perform the activity. Where necessary, capital costs were also included. The 9-year cost discounted at 7 percent to comply with the GHG measure discussed in this document is \$11.0 million. By proposing to remove the GHG measure in this rulemaking,

FHWA is proposing a deregulatory action that may result in cost-savings of \$11.0 million discounted at 7 percent over 9 years.

Table X displays the Office of Management and Budget (OMB) A–4 Accounting statement as a summary of the cost savings associated with repealing the GHG measure.

TABLE X—OMB A–4 ACCOUNTING STATEMENT

Category	Estimates			Units			Source/citation
	Primary	Low	High	Year dollar	Discount rate %	Period covered (years)	
Benefits							
Annualized Monetized (\$ millions/year).	None .....	None .....	None .....	NA	7	NA	Not Quantified.
	None .....	None .....	None .....	NA	3	NA	
Annualized Quantified .....	None .....	None .....	None .....	NA	7	NA	Not Quantified.
	None .....	None .....	None .....	NA	3	NA	
Qualitative .....	More informed decisionmaking on project, program, and policy choices.						NPRM RIA.
Costs							
Annualized Monetized (\$/year) .....	– \$1,682,339 .....	.....	.....	2014	7	9	NPRM RIA.
	– \$1,655,267 .....	.....	.....	2014	3	9	
Annualized Quantified .....	None .....	None .....	None .....	2014	7	9	NPRM RIA.
	None .....	None .....	None .....	2014	3	9	
Qualitative							
Transfers	None						
From/To	From:			To:			
Effects							
State, Local, and/or Tribal Government.	– \$1,682,339 .....	.....	.....	2014	7	9	NPRM RIA.
	– \$1,655,267 .....	.....	.....	2014	3	9	
Small Business .....	Not expected to have a significant impact on a substantial number of small entities.			NA	NA	NA	NPRM RIA.

## II. Acronyms and Abbreviations

Acronym or abbreviation	Term	Acronym or abbreviation	Term
APA .....	Administrative Procedure Act.	GHG .....	Greenhouse gas.
CFR .....	Code of Federal Regulations.	HPMS .....	Highway Performance Monitoring System.
CH <sub>4</sub> .....	Methane.	HFCs .....	Hydrofluorocarbons.
CMAQ .....	Congestion Mitigation and Air Quality Improvement Program.	MAP–21 .....	Moving Ahead for Progress in the 21st Century Act.
CO <sub>2</sub> .....	Carbon dioxide.	MOVES .....	Motor Vehicle Emission Simulator.
DOT .....	U.S. Department of Transportation.	MPO .....	Metropolitan Planning Organizations.
EO .....	Executive Order.	N <sub>2</sub> O .....	Nitrous oxide.
EERPAT .....	Energy and Emissions Reduction Policy Analysis Tool.	NHPP .....	National Highway Performance Program.
EIA .....	Energy Information Agency, U.S. Department of Energy.	NHS .....	National Highway System.
FAST Act .....	Fixing America's Surface Transportation Act.	NPRM .....	Notice of proposed rule-making.
FHWA .....	Federal Highway Administration.	NPMRDS .....	National Performance Management Research Data Set.
FR .....	Federal Register.	OMB .....	Office of Management and Budget.
		PRA .....	Paperwork Reduction Act of 1995.
		RIA .....	Regulatory Impact Analysis.
		RIN .....	Regulatory Identification Number.
		SMEs .....	Subject Matter Experts.
		State DOTs	State departments of transportation.
		U.S.C. ....	United States Code.
		VMT .....	Vehicle miles traveled.

## III. Background

The third performance measure NPRM was published on April 22, 2016 (81 FR 238060).<sup>7</sup> The third performance

<sup>7</sup> Third performance measure NPRM: “Assessing Performance of the National Highway System, Freight Movement on the Interstate System, and

Continued

measure NPRM proposed a set of national measures for State DOTs to use to assess the performance of the Interstate and non-Interstate NHS to carry out the NHPP; to assess freight movement on the Interstate System; and to assess traffic congestion and on-road mobile source emissions for the purpose of carrying out the CMAQ Program.

In the preamble to the third performance measure NPRM, FHWA sought public comment on whether and how to establish a CO<sub>2</sub> emissions measure in the final rule. The FHWA asked a series of questions regarding the design and implementation of a GHG measure and whether one should be established.

The FHWA received thousands of comments on whether to establish such a measure and how a measure should be designed and implemented. Supporting comments came from 9 State DOTs, 24 MPOs, 19 U.S. Senators, 48 Members of the U.S. House of Representatives, over 100 cities, numerous local officials, over 100 businesses, 91,695 citizens, and over 100 public interest, non-profit and advocacy organizations. Some State DOTs and MPOs already use GHG emissions as a performance measure.

Comments against a GHG measure were submitted by 10 State DOTs, 2 MPOs, 5 U.S. Senators, 31 Members of the U.S. House of Representatives, and 27 transportation and infrastructure industry associations. In addition, nine State DOTs and three industry associations requested that FHWA not establish any performance measures not explicitly authorized in legislation, because GHG is not identified in the legislation.

Several of the commenters in both groups addressed whether FHWA has the legal authority to establish a GHG measure and whether such measure could be established in this rulemaking.

The FHWA published the third performance measure final rule on January 18, 2017, at 82 FR 5971.<sup>8</sup> The GHG policy established in the final rule was the measure discussed in the third performance measure NPRM: total annual tons of CO<sub>2</sub> emissions from all on-road mobile sources. The rule requires State DOTs to calculate the measure by multiplying motor fuel sales volumes by emissions factors of CO<sub>2</sub> per gallon of fuel and percentage VMT on the NHS. A metropolitan planning areawide GHG metric may be: (1) A share of the State's (or States') VMT as

a proxy for that metropolitan planning area share of CO<sub>2</sub> emissions; (2) VMT estimates along with MOVES<sup>9</sup> emissions factors; (3) FHWA's Energy and Emissions Reduction Policy Analysis Tool (EERPAT) model;<sup>10</sup> or (4) other method the MPO can demonstrate has valid and useful results for CO<sub>2</sub> measurement.

On January 30, 2017, President Donald J. Trump issued Executive Order 13771, entitled, "Reducing Regulation and Controlling Regulatory Costs,"<sup>11</sup> which required Federal agencies to take proactive measures to reduce the costs associated with complying with Federal regulations. Additionally, on February 24, 2017, the President issued Executive Order 13777, entitled, "Enforcing the Regulatory Reform Agenda,"<sup>12</sup> which required Federal agencies to designate a Regulatory Reform Office and a Regulatory Reform Task Force charged with reviewing agency regulations. Furthermore, the Administration is considering a number of policy changes with respect to climate change. For example, the Administration has announced its intent to withdraw from the Paris Accords. Pursuant to Executive Order 13771 and 13777, the DOT commenced a review of existing and pending regulations, which included the third performance measure final rule, to determine whether changes would be appropriate to eliminate duplicative regulations and streamline regulatory processes. Based upon this review, DOT identified the GHG measure of the third performance measure final rule as being potentially duplicative of existing efforts in some States, and burdensome. Also, the performance management statute (23 U.S.C. 150) does not explicitly require a GHG measure. For these reasons, this NPRM proposes to repeal the GHG measure.

This rulemaking proposes to repeal the GHG measure, while seeking additional public comment on whether to retain, or revise the GHG measure established in the third performance measure final rule. This rulemaking seeks additional information that may not have been available to the Agency during the development of the final rule. Additional information will aid

FHWA in determining whether the measure should be repealed, retained, or revised.

During the first public comment period, several commenters argued that, should FHWA decide to establish a GHG measure, it should do so through a separate rulemaking. They claimed that the third performance measure NPRM did not provide sufficient detail about the type of measure FHWA might adopt for them to comment on the issue meaningfully. The FHWA believes that sufficient notice was provided in the third performance measure NPRM under the Administrative Procedure Act (APA); however, we are mindful that the third performance measure NPRM did not include proposed regulatory text for the GHG measure. Although the APA does not require proposed regulatory text to be included in the third performance measure NPRM, FHWA acknowledges that the GHG measure was presented differently than the other measures in that it was discussed in the preamble using a series of questions to limit the scope of the proposal. Some commenters stated that they found it difficult to formulate meaningful comments using this approach alone.

In the third performance measure final rule preamble, FHWA recognized that the GHG measure chosen—the percent change in tailpipe CO<sub>2</sub> emissions on the NHS compared to the Calendar Year 2017 level—is imperfect. It is measured by calculating fuel sales and multiplying the associated CO<sub>2</sub> emissions by the proportion of VMT that takes place on the NHS. As noted in the final rule preamble, this methodology is not a perfect proxy, as speeds, operating conditions, and vehicle types on the NHS differ from those that are on other roads and differ between States. The FHWA indicated that the methodology adopted was a balance between the competing goals of simplicity and precision. We request comments on whether the lack of precision in the methodology markedly impedes the ability of State DOTs and MPOs to use the measure and associated targets in evaluating system performance and making investment decisions.

The FHWA is interested in whether data are available to more directly measure GHG emissions effects of NHS projects undertaken by States or MPOs. The FHWA is responsible for establishing the data elements that are necessary to collect and maintain the standardized data to carry out a performance-based approach under 23 U.S.C. 150(c)(3)(A)(iv). We request comments on whether the data used to calculate the measure is precise enough

Congestion Mitigation and Air Quality Improvement Program" (RIN 2125-AF54): <https://www.gpo.gov/fdsys/pkg/FR-2016-04-22/pdf/2016-08014.pdf>.

<sup>8</sup> <https://www.gpo.gov/fdsys/pkg/FR-2017-01-18/pdf/2017-00681.pdf>.

<sup>9</sup> EPA's Motor Vehicle Emissions Simulator (MOVES): <https://www.epa.gov/moves>.

<sup>10</sup> FHWA's Energy and Emissions Reduction Policy Analysis Tool (EERPAT) [https://www.planning.dot.gov/FHWA\\_tool/default.aspx](https://www.planning.dot.gov/FHWA_tool/default.aspx).

<sup>11</sup> 82 FR 9339, February 3, 2017. <https://www.gpo.gov/fdsys/pkg/FR-2017-02-03/pdf/2017-02451.pdf>.

<sup>12</sup> 82 FR 10691, February 14, 2017. <https://www.whitehouse.gov/the-press-office/2017/02/24/presidential-executive-order-enforcing-regulatory-reform-agenda>.



to meet these goals. Please identify any information that may mitigate some of the limitations of the proposed GHG measure.

In addition, commenters are encouraged to provide information regarding whether the measure, including the methodology adopted in the final rule, provides meaningful utility for assessment of environmental performance of the NHS by States and MPOs. Please provide any information or data that would justify the utility of the measure relative to the increased burden to the States and MPOs reporting this information.

Finally, FHWA also requests input from States and MPOs on the potential costs imposed by the addition of this measure in the third performance measure final rule. Because a GHG measure was not proposed in the NPRM, the costs were not presented in that economic analysis. The FHWA did provide an assessment of the benefits and costs of all the measures in the final rule. As part of this rulemaking, FHWA is analyzing the costs associated solely with the GHG measure, and the attendant savings that would result from its repeal. The FHWA requests data from States and MPOs on the costs imposed due solely to the addition of this measure. Given that several States are already conducting efforts in this area, FHWA requests information on whether the GHG measure is a duplicative requirement and whether FHWA's estimate of the cost savings associated with a repeal of the GHG measure are accurate. Additionally, FHWA requests information from States not currently conducting similar efforts on the burdens this measure would impose.

Further, in the final rule, the GHG measure was adopted under 23 U.S.C. 150(c)(3) (NHPP) and not 23 U.S.C. 150(c)(5) (CMAQ). As the measure is under the NHPP program, State DOTs are subject to a significant progress determination if they fail to achieve their targets and, if they fail to make significant progress, additional reporting requirements. Because of these potential burdens, FHWA requests comments on any costs to States associated with the NHPP significant progress determination for the GHG measure.<sup>13</sup>

#### IV. Rulemaking Analyses and Notices

##### *A. Rulemaking Analysis and Notices Executive Order 12866 (Regulatory Planning and Review), Executive Order 13563 (Improving Regulation and Regulatory Review), Executive Order 13771 (Reducing Regulations and Controlling Regulatory Costs), and DOT Regulatory Policies and Procedures*

The FHWA has determined that this action is a significant regulatory action within the meaning of Executive Order (E.O.) 12866 and within the meaning of DOT regulatory policies and procedures due to the significant public interest in regulations related to performance management. It is anticipated that the economic impact of this rulemaking will not be economically significant within the meaning of E.O. 12866 as discussed below. This action complies with E.O.s 12866, 13563, and 13771 to improve regulation. This action is considered significant because of widespread public interest in the transformation of the Federal-aid highway program to be performance-based, although it is not economically significant within the meaning of E.O. 12866.

The FHWA considers this proposed rule to be an E.O. 13771 deregulatory action, resulting in \$11.0 million in cost-savings discounted at 7 percent over 9 years. Details on the estimated cost savings of this proposed rule are presented in the RIA (or regulatory impact analysis), which may be accessed from the docket (docket number FHWA–2013–0054). The RIA evaluates the economic impact, in terms of costs and benefits, on Federal, State, and local governments, as well as private entities regulated under this action, as required by E.O. 12866 and E.O. 13563. However, the RIA does not attempt to quantify any changes from improved decisionmaking that would result in benefits if the GHG measure requirement were retained.

##### Estimated Cost Savings of Repealing the GHG Measure

To estimate cost savings from repealing the GHG measure, FHWA assessed the level of effort, expressed in labor hours and categories, and the capital needed to comply with the requirement as provided in the third performance management final rule. Level of effort by labor category is monetized with loaded wage rates to estimate total costs.

Table X displays the total cost for the GHG measure for the 9-year study period (2018–2026). The FHWA chose an 9-year analysis period and displayed the values in 2014 dollars in order to correlate the values presented in this NPRM with those presented in the third performance measure final rule. Total costs are estimated to be \$10,960,828 discounted at 7 percent, and \$12,888,091 discounted at 3 percent.

TABLE X—TOTAL COST SAVINGS FROM REPEALING THE GHG MEASURE

Cost components	9-Year total cost		Annualized cost	
	7%	3%	7%	3%
Section 490.105–490.109—Reporting Requirements .....	\$9,090,263	\$10,652,791	\$1,395,232	\$1,368,179
Establish and Update Performance Targets .....	6,368,958	7,392,818	977,549	949,488
Reporting on Performance Targets Progress .....	2,573,869	3,068,421	395,054	394,089
Assess Significant Progress Toward Achieving Performance Targets .....	147,435	191,552	22,629	24,602
Section 490.511—Calculation of System Performance Metrics .....	1,821,862	2,177,239	279,631	279,631
Calculate Annual Total Tailpipe CO <sub>2</sub> Emissions .....	1,821,862	2,177,239	279,631	279,631
Section 490.513—Calculation of System Performance Measures .....	48,703	58,061	7,475	7,457
Calculate % Change in Tailpipe CO <sub>2</sub> Emissions the NHS Compared to the Calendar Year 2017 Level Perf. Measure .....	48,703	58,061	7,475	7,457
Total Cost of Final Rule .....	10,960,828	12,888,091	1,682,339	1,655,267

This action complies with the principles of E.O. 13563. After evaluating the costs and benefits of the

rule, FHWA believes that the cost savings from this rulemaking would exceed the foregone benefits. These

changes are not anticipated to adversely affect, in any material way, any sector of the economy. In addition, these

<sup>13</sup> 23 CFR 490.109.

changes will not create a serious inconsistency with any other agency's action or materially alter the budgetary impact of any entitlements, grants, user fees, or loan programs.

#### *B. Regulatory Flexibility Act*

In compliance with the Regulatory Flexibility Act (Pub. L. 96–354, 5 U.S.C. 601–612), FHWA has evaluated the effects of this action on small entities and has determined that the action would not have a significant economic impact on a substantial number of small entities. The rule addresses the obligation of Federal funds to State DOTs for Federal-aid highway projects. The rule affects two types of entities: State governments and MPOs. State governments do not meet the definition of a small entity under 5 U.S.C. 601, which have a population of less than 50,000.

The MPOs are considered governmental jurisdictions, and to qualify as a small entity they would need to serve less than 50,000 people. The MPOs serve urbanized areas with populations of 50,000 or more. As discussed in the RIA, the rule is expected to impose costs on MPOs that serve populations exceeding 200,000. Therefore, the MPOs that incur economic impacts under this rule do not meet the definition of a small entity.

I hereby certify that this regulatory action would not have a significant economic impact on a substantial number of small entities.

#### *C. Unfunded Mandates Reform Act of 1995*

The FHWA has determined that this action does not impose unfunded mandates as defined by the Unfunded Mandates Reform Act of 1995 (Pub. L. 104–4, March 22, 1995, 109 Stat. 48). This rule does not include a Federal mandate that may result in expenditures of \$151 million or more in any 1 year (when adjusted for inflation) in 2012 dollars for either State, local, and tribal governments in the aggregate, or by the private sector. Additionally, the definition of “Federal mandate” in the Unfunded Mandates Reform Act excludes financial assistance of the type in which State, local, or tribal governments have authority to adjust their participation in the program in accordance with changes made in the program by the Federal Government. The Federal-aid highway program permits this type of flexibility.

#### *D. Executive Order 13132 (Federalism Assessment)*

The FHWA has analyzed this action in accordance with the principles and

criteria contained in E.O. 13132. The FHWA has determined that this action does not have sufficient federalism implications to warrant the preparation of a federalism assessment. The FHWA has also determined that this action does not preempt any State law or State regulation or affect the States' ability to discharge traditional State governmental functions.

#### *E. Executive Order 12372 (Intergovernmental Review)*

The regulations implementing E.O. 12372 regarding intergovernmental consultation on Federal programs and activities apply to this program. Local entities should refer to the Catalog of Federal Domestic Assistance Program Number 20.205, Highway Planning and Construction, for further information.

#### *F. Paperwork Reduction Act*

Under the PRA (44 U.S.C. 3501, *et seq.*), Federal agencies must obtain approval from the OMB for each collection of information they conduct, sponsor, or require through regulations. The DOT has analyzed this action under the PRA and has determined that this rulemaking does not contain collection of information requirements for the purposes of the PRA. If finalized, this proposal would reduce PRA burdens associated with this measure.

#### *G. National Environmental Policy Act*

The FHWA has analyzed this action for the purpose of NEPA, as amended (42 U.S.C. 4321 *et seq.*), and has determined that this action would not have any effect on the quality of the environment and meets the criteria for the categorical exclusion at 23 CFR 771.117(c)(20).

#### *H. Executive Order 12630 (Taking of Private Property)*

The FHWA has analyzed this action under E.O. 12630, Governmental Actions and Interference with Constitutionally Protected Property Rights. The FHWA does not anticipate that this action would affect a taking of private property or otherwise have taking implications under E.O. 12630.

#### *I. Executive Order 12988 (Civil Justice Reform)*

This action meets applicable standards in sections 3(a) and 3(b)(2) of E.O. 12988, Civil Justice Reform, to minimize litigation, eliminate ambiguity, and reduce burden.

#### *J. Executive Order 13045 (Protection of Children)*

We have analyzed this rule under E.O. 13045, Protection of Children from

Environmental Health Risks and Safety Risks. The FHWA certifies that this action would not cause an environmental risk to health or safety that might disproportionately affect children.

#### *K. Executive Order 13175 (Tribal Consultation)*

The FHWA has analyzed this action under E.O. 13175, dated November 6, 2000, and believes that the action would not have substantial direct effects on one or more Indian tribes; would not impose substantial direct compliance costs on Indian tribal governments; and would not preempt tribal laws. The rulemaking addresses obligations of Federal funds to State DOTs for Federal-aid highway projects and would not impose any direct compliance requirements on Indian tribal governments. Therefore, a tribal summary impact statement is not required.

#### *L. Executive Order 13211 (Energy Effects)*

The FHWA has analyzed this action under E.O. 13211, Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use. The FHWA has determined that this is not a significant energy action under that order and is not likely to have a significant adverse effect on the supply, distribution, or use of energy. Therefore, a Statement of Energy Effects is not required.

#### *M. Executive Order 12898 (Environmental Justice)*

The E.O. 12898 requires that each Federal agency make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minorities and low-income populations. The FHWA has determined that this rule does not raise any environmental justice issues.

#### *N. Regulation Identifier Number*

An RIN is assigned to each regulatory action listed in the Unified Agenda of Federal Regulations. The Regulatory Information Service Center publishes the Unified Agenda in April and October of each year. The RIN number contained in the heading of this document can be used to cross-reference this action with the Unified Agenda.

## List of Subjects in 23 CFR Part 490

Bridges, Highway safety, Highways and roads, Reporting and recordkeeping requirements.

Issued in Washington, DC, on September 29, 2017 under authority delegated in 49 CFR 1.85.

**Brandye L. Hendrickson,**  
*Acting Administrator, Federal Highway Administration.*

In consideration of the foregoing, FHWA proposes to amend 23 CFR part 490 to read as follows:

## PART 490—NATIONAL PERFORMANCE MANAGEMENT MEASURES

■ 1. The authority citation for part 490 continues to read as follows:

**Authority:** 23 U.S.C. 134, 135, 148(i), and 150; 49 CFR 1.85.

### Subpart A—General Information

#### § 490.105 [Amended].

■ 2. Amend § 490.105 by removing and reserving paragraphs (c)(5) and (d)(1)(v).

#### § 490.107 [Amended].

■ 3. Amend § 490.107 by removing and reserving paragraphs (b)(1)(ii)(H), (b)(2)(ii)(J), (b)(3)(ii)(I), and (c)(4).

■ 4. Amend § 490.109 by removing and reserving paragraphs (d)(1)(v) and (f)(1)(v) and revising paragraph (d)(1)(vi) to read as follows:

#### § 490.109 Assessing significant progress toward achieving the performance targets for the National Highway Performance Program and the National Highway Freight Program.

\* \* \* \* \*

(d) \* \* \* (1) \* \* \*

(vi) Baseline condition/performance data contained in HPMS and NBI of the year in which the Baseline Period Performance Report is due to FHWA that represents baseline conditions/performances for the performance period for the measures in §§ 490.105(c)(1) through (4).

\* \* \* \* \*

### Subpart E—National Performance Management Measures to Assess Performance of the National Highway System

#### § 490.503 [Amended].

■ 5. Amend § 490.503 by removing and reserving paragraph (a)(2).

#### § 490.505 [Amended].

■ 6. Amend § 490.505 by removing the definition for “Greenhouse gas (GHG).”

#### § 490.507 [Amended].

■ 7. Amend § 490.507 by removing and reserving paragraph (b).

#### § 490.509 [Amended].

■ 8. Amend § 490.509 by removing paragraphs (f)–(h).

#### § 490.511 [Amended].

■ 9. Amend § 490.511 by removing and reserving paragraphs (a)(2), (c), (d), and (f).

#### § 490.513 [Amended].

■ 10. Amend § 490.513 by removing paragraph (d).

[FR Doc. 2017–21442 Filed 10–4–17; 8:45 am]

BILLING CODE 4910–22–P

## ENVIRONMENTAL PROTECTION AGENCY

### 40 CFR Part 52

[EPA–R07–OAR–2017–0386; FRL–9968–75–Region 7]

### Approval of Nebraska Air Quality Implementation Plans; Adoption of a New Chapter Under the Nebraska Administrative Code

**AGENCY:** Environmental Protection Agency (EPA).

**ACTION:** Proposed rule.

**SUMMARY:** The Environmental Protection Agency (EPA) is proposing to approve the State Implementation Plan (SIP) revision submitted by the state of Nebraska on November 14, 2011. Nebraska is adding a new chapter titled “Visibility Protection” which provides Nebraska authority to implement Federal regulations relating to Regional Haze and Best Available Retrofit Technology (BART). The chapter incorporates by reference EPA’s Guidelines for BART Determinations under the Regional Haze Rule. The revision to the SIP meets the visibility component of the Clean Air Act (CAA). **DATES:** Comments on this proposed action must be received in writing by November 6, 2017.

**ADDRESSES:** Submit your comments, identified by Docket ID No. EPA–R07–OAR–2017–0386, to <https://www.regulations.gov>. Follow the online instructions for submitting comments. Once submitted, comments cannot be edited or removed from *Regulations.gov*. The EPA may publish any comment received to its public docket. Do not submit electronically any information you consider to be Confidential Business Information (CBI) or other information whose disclosure is restricted by statute. Multimedia

submissions (audio, video, etc.) must be accompanied by a written comment. The written comment is considered the official comment and should include discussion of all points you wish to make. The EPA will generally not consider comments or comment contents located outside of the primary submission (*i.e.* on the web, cloud, or other file sharing system). For additional submission methods, the full EPA public comment policy, information about CBI or multimedia submissions, and general guidance on making effective comments, please visit <https://www2.epa.gov/dockets/commenting-epa-dockets>.

**FOR FURTHER INFORMATION CONTACT:** Greg Crable, Environmental Protection Agency, Air Planning and Development Branch, 11201 Renner Boulevard, Lenexa, Kansas 66219 at (913) 551–7391, or by email at [crable.gregory@epa.gov](mailto:crable.gregory@epa.gov).

**SUPPLEMENTARY INFORMATION:** This document proposes to take action to add chapter 43, “Visibility Protection”. We have published a direct final rule approving the State’s SIP revision in the “Rules and Regulations” section of this **Federal Register**, because we view this as a noncontroversial action and anticipate no relevant adverse comment. We have explained our reasons for this action in the preamble to the direct final rule. If we receive no adverse comment, we will not take further action on this proposed rule. If we receive adverse comment, we will withdraw the direct final rule and it will not take effect. We would address all public comments in any subsequent final rule based on this proposed rule. We do not intend to institute a second comment period on this action. Any parties interested in commenting must do so at this time. For further information, please see the information provided in the **ADDRESSES** section of this document.

### List of Subjects in 40 CFR Part 52

Environmental protection, Air pollution control, Carbon monoxide, Incorporation by reference, Intergovernmental relations, Lead, Nitrogen dioxide, Ozone, Particulate matter, Reporting and recordkeeping requirements, Sulfur oxides, Volatile organic compounds.

Dated: September 25, 2017.

**Cathy Stepp,**

*Acting Regional Administrator, Region 7.*

[FR Doc. 2017–21381 Filed 10–4–17; 8:45 am]

BILLING CODE 6560–50–P



## DEPARTMENT OF TRANSPORTATION

### Federal Highway Administration

#### 23 CFR Part 490

[Docket No. FHWA–2013–0020]

RIN 2125–AF49

#### National Performance Management Measures: Highway Safety Improvement Program

**AGENCY:** Federal Highway Administration (FHWA), Department of Transportation (DOT).

**ACTION:** Final rule.

**SUMMARY:** The purpose of this final rule is to establish performance measures for State departments of transportation (State DOT) to use to carry out the Highway Safety Improvement Program (HSIP) and to assess the: Number of motor vehicle crash-related serious injuries and fatalities; number of serious injuries and fatalities of non-motorized users; and serious injuries and fatalities per vehicle miles traveled (VMT).

The FHWA issues this final rule based on section 1203 of the Moving Ahead for Progress in the 21st Century Act (MAP–21), which identifies national transportation goals and requires the Secretary to promulgate a rulemaking to establish performance measures and standards in specified Federal-aid highway program areas. The FHWA also considered the provisions in the Fixing America's Surface Transportation Act (FAST Act) in the development of this final rule. The HSIP is a Federal-aid highway program with the purpose of achieving a significant reduction in fatalities and serious injuries on all public roads, including non-State-owned public roads and roads on tribal lands.

**DATES:** This final rule is effective April 14, 2016. The incorporation by reference of certain publications listed in the regulation is approved by the Director of the Federal Register as of April 14, 2016.

**FOR FURTHER INFORMATION CONTACT:** Francine Shaw Whitson, Office of Infrastructure, (202) 366–8028, or Anne Christenson, Office of the Chief Counsel, (202) 366–0740, Federal Highway Administration, 1200 New Jersey Ave. SE., Washington, DC 20590. Office hours are from 8:00 a.m. to 4:30 p.m., e.t., Monday through Friday, except Federal holidays.

#### SUPPLEMENTARY INFORMATION:

##### Electronic Access and Filing

The notice of proposed rulemaking (NPRM) published at 79 FR 13846 on March 11, 2014, and all comments

received may be viewed online through: <http://www.regulations.gov>. Electronic retrieval help and guidelines are available on the Web site. It is available 24 hours each day, 365 days each year. An electronic copy of this document may also be downloaded from the Office of the Federal Register's home page at: <http://www.federalregister.gov> and the Government Printing Office's Web site at: <http://www.gpo.gov>.

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#### I. Executive Summary

##### A. Purpose of the Regulatory Action

The MAP–21 (Pub. L. 112–141) and the FAST Act (Pub. L. 114–94) transform the Federal-aid highway program by establishing new performance management requirements to ensure that State DOTs and Metropolitan Planning Organizations (MPO) choose the most efficient investments for Federal transportation funds. Performance management refocuses attention on national transportation goals, increases the accountability and transparency of the Federal-aid highway program, and improves project decisionmaking through performance-based planning and programming. State DOTs will now be required to establish performance targets and assess performance in 12 areas<sup>1</sup> established by the MAP–21, and FHWA will assess<sup>2</sup> their progress toward meeting targets in 10 of these areas.<sup>3</sup> State DOTs that fail to meet or make significant progress toward meeting safety targets will be required to direct a portion of their HSIP funding toward projects that will improve safety.

This rule establishes the performance measures to carry out the HSIP and to assess serious injuries and fatalities on

all public roads. This is the first of 3 rules that will establish performance measures for State DOTs and MPOs to use to carry out Federal-aid highway programs and assess performance in each of 12 areas. In addition, this rule establishes the process for State DOTs and MPOs to use to establish and report their safety targets, the process for State DOTs and MPOs to report on their progress for their safety targets, and the process that FHWA will use to assess whether State DOTs have met or made significant progress toward meeting safety targets.

This rule establishes regulations to more effectively evaluate and report on surface transportation safety across the country. These regulations will: Improve data by providing for greater consistency in the reporting of serious injuries; improve transparency by requiring reporting on serious injuries and fatalities through a public reporting system; enable targets and progress to be aggregated at the national level; require State DOTs to meet or make significant progress toward meeting their targets; and establish requirements for State DOTs that have not met or made significant progress toward meeting their targets. State DOTs and MPOs will be expected to use the information and data generated as a result of the new regulations to inform their transportation planning and programming decisionmaking and directly link investments to desired performance outcomes. In particular, FHWA expects that the new performance measures outlined in this rule will help State DOTs and MPOs make investment decisions that will result in the greatest possible reduction in fatalities and serious injuries. This regulation is also aligned with DOT support of the Toward Zero Deaths (TZD) vision, which has also been adopted by many State DOTs. While MAP–21 does not specify targets for agencies, per the authorizing statute, this performance measures system is an important step in measuring and holding accountable transportation agencies as they work toward the goal of eliminating traffic deaths and serious injuries. These regulations will also help provide FHWA the ability to better communicate a national safety performance story.

##### B. Summary of Major Provisions

In this rule, FHWA establishes the measures to be used by State DOTs to assess performance and carry out the HSIP; the process for State DOTs and MPOs to establish their safety targets; the methodology to determine whether State DOTs have met or made

<sup>1</sup> These areas are listed within 23 U.S.C. 150(c), which requires the Secretary to establish measures to assess performance or condition.

<sup>2</sup> 23 U.S.C. 148(i) and 23 U.S.C. 119(e)(7).

<sup>3</sup> Title 23, sections 119(e)(7), 148(i), and 167(j) require USDOT to assess significant progress in 10 of the 12 performance measure areas (5 for the NHPP, 4 for HSIP, and 1 for freight).

significant progress toward meeting their safety targets; and the process for State DOTs and MPOs to report on progress for their safety targets.

This final rule retains the majority of the major provisions of the NPRM but makes significant changes by (a) establishing a fifth performance measure to assess the number of combined non-motorized fatalities and non-motorized serious injuries and (b) revising the methodology for assessing whether a State has met or made significant progress toward meeting its targets. The FHWA updates these and other elements of the NPRM based on the review and analysis of comments received.

The FHWA establishes 5 performance measures to assess performance and carry out the HSIP: (1) Number of fatalities, (2) rate of fatalities per VMT, (3) number of serious injuries, (4) rate of serious injuries per VMT, and (5) number of combined non-motorized fatalities and non-motorized serious injuries. The FHWA sought comment on how a non-motorized measure could be included in this rulemaking and, in response to comments establishes the non-motorized measure included in this final rule. The measures will be calculated based on a 5-year rolling average.

In response to comments, FHWA has made changes to the process for assessing whether a State met or made significant progress toward meeting its targets based on whether the process would meet the following criteria: (a) Holds States to a higher level of accountability; (b) does not discourage aggressive targets; (c) supports the national goal to achieve a significant reduction in fatalities and serious injuries; (d) is fair and consistent/quantitative; (e) is simple/understandable/transparent; (f) is not based on historical trends; and (g) is associated with the targets. The FHWA adopts in this final rule that a State is determined to meet or make significant progress toward meeting its targets when four out of five targets are met or the outcome for the performance measure is better than the State's baseline safety performance for that measure.

This rule establishes the processes for State DOTs and MPOs to establish their safety targets and to report on progress for their safety targets. State DOT targets shall be identical to the targets established by the State Highway Safety Office (SHSO) for common performance measures reported in the State's Highway Safety Plan (HSP). Targets established by the State DOTs will begin to be reported in the first HSIP annual

report that is due after 1 year from the effective date of this final rule and then each year thereafter in subsequent HSIP annual reports. Once submitted in an HSIP report, approval from FHWA (and from the National Highway Transportation Safety Administration (NHTSA) for the common performance measures in the HSP) would be required to change a State's performance target for that year. However, the State will be free to establish new targets for subsequent years in the following year's HSIP report. States may choose to establish separate targets for any urbanized area within the State and may also choose to establish a single non-urbanized target for all of the non-urbanized areas in a State. These optional targets will not be included in assessing whether the State met or made significant progress toward meeting its targets.

The MPOs may choose between programing projects in support of all the State targets, establishing specific numeric targets for all of the performance measures (number or rate), or establishing specific numeric targets for one or more individual performance measures (number or rate) and supporting the State target on other performance measures. For MPOs with planning boundaries that cross State lines, the MPO must plan and program projects to contribute toward separate sets of targets—one set for each State in which the planning area boundary extends.

State DOTs that have not met or made significant progress toward meeting safety performance targets must: (1) Use a portion of their obligation authority only for HSIP projects and (2) submit an annual implementation plan that describes actions the State DOT will take to meet their targets. Both of these provisions will facilitate transportation safety initiatives and improvements and help focus Federal resources in areas where Congress has deemed a national priority.

State DOTs and MPOs are expected to use the information and data generated as a result of this new regulation to better inform their transportation planning and programming decisionmaking, and specifically to use their resources in ways that will result in the greatest possible reduction in fatalities and serious injuries.

The FHWA has decided to phase in the effective dates for the three final rules for these performance measures so that each of the three performance measures rules will have individual effective dates. This allows FHWA and the States to begin implementing some of the performance requirements much

sooner than waiting for the rulemaking process to be complete for all the rules.

The FHWA also updates several other elements of the NPRM based on the review and analysis of comments received. Section references below refer to sections of the regulatory text for title 23 of the Code of Federal Regulations (CFR).

The FHWA adds a provision to incorporate by reference the Model Minimum Uniform Crash Criteria (MMUCC) Guideline, 4th Edition, and the ANSI D16.1–2007, Manual on Classification of Motor Vehicle Traffic Accidents, 7th Edition, in § 490.111 because MMUCC is used in the definition of the number of serious injuries and ANSI D16.1–2007 is used in the definition of non-motorized serious injuries. The FHWA also extends the time period proposed in the NPRM for States to adopt the MMUCC 4th Edition definition and attribute for “Suspected Serious Injury (A)” from 18 months (as proposed in the NPRM) to 36 months. The requirement to adopt revised future editions of MMUCC subsequent to the 4th Edition is removed.

The FHWA updates the list of definitions in § 490.205 to remove definitions no longer required and to add new definitions based on the revised methodology for determining whether a State has met or made significant progress toward meeting its performance targets. The FHWA also adds definitions to define explicitly the terms used in the new performance measures.

Section 490.207 establishes the safety performance measures State DOTs and MPOs shall use to assess roadway safety. State DOTs and MPOs shall measure serious injuries and fatalities per VMT, and the total numbers of both serious injuries and fatalities. In addition to those proposed in the NPRM, the FHWA adds a performance measure to assess the number of combined non-motorized fatalities and non-motorized serious injuries. Each of the performance measures use a 5-year rolling average. The exposure rate measures are calculated annually per 100 million VMT. Data for the fatality-related measures are taken from the Fatality Analysis Reporting System (FARS) and data for the serious injury-related measures are taken from the State motor vehicle crash database. The VMT are derived from the Highway Performance Monitoring System (HPMS). For MPOs that choose to establish a quantifiable rate target, the exposure data for serious injury and fatality rates are calculated annually per 100 million VMT from the MPO's

estimate of VMT that is consistent with other Federal reporting requirements, if applicable. The FHWA added the provision for MPO VMT estimates since the NPRM did not identify an appropriate source for MPO VMT, as it does not exist in the HPMS.

Section 490.209 describes the process State DOTs and MPOs shall use to establish their targets for each of the safety measures. The FHWA reduces the number of years of historical data that must be included in the HSIP report, consistent with changes to the methodology for assessing significant progress. In addition, FHWA revises the option for States to establish separate urbanized and non-urbanized area targets. Rather than allowing States to establish one additional urbanized area target for all urbanized areas within the State, the final rule allows State DOTs to select any number and combination of urbanized area boundaries and a single non-urbanized area for the establishment of additional targets. This change provides flexibility for States because the rule does not include optional urbanized and non-urbanized targets in the assessment of whether a State has met or made significant progress toward meeting its targets. The FHWA retains the requirement that the performance measures common to the State's HSP and the HSIP (number of fatalities, fatality rate, and number of serious injuries) be defined identically, as coordinated through the State Strategic Highway Safety Plan (SHSP).<sup>4</sup>

Section 490.211 establishes the method FHWA will use to assess whether State DOTs have met or have made significant progress toward meeting their safety performance targets in accordance with 23 U.S.C. 148(i). Based on review and analysis of comments, FHWA revises the method proposed in the NPRM. In this final rule, a State DOT is determined to have met or made significant progress toward meeting its targets when at least four of the five required performance targets are either met or the safety outcome for the performance measure has improved (*i.e.*, the number or rate of fatalities and/or serious injuries is less than the 5-year rolling average data for the performance measure for the year prior to the establishment of the State's target). The

FHWA also reduces the time lag between when the State establishes the targets and when FHWA will assess whether the State has met or made significant progress toward meeting its targets. Instead of using Final FARS for all 5 years of data that comprise the rolling average, FHWA adopts the use of the FARS Annual Report File (ARF) if Final FARS data are not available. This approach allows FHWA to assess whether States met or made significant progress toward meeting their targets 1 year earlier than proposed in the NPRM. However, FHWA recognizes the timeframe for this determination remains lengthy. In order to accelerate the transparency that is one of the goals of the MAP-21, FHWA is in the process of creating a new public Web site to help communicate the national performance story. The Web site will likely include infographics, tables, charts, and descriptions of the performance data that the State DOTs would be reporting to FHWA. The FHWA will make publicly available postings of State performance statistics and other relevant data that relate to this performance measurement system as soon as the data are available.

The method by which FHWA will review performance progress of MPOs is discussed in the update to the Statewide and Metropolitan Planning regulation as described in 23 CFR part 450.

Section 490.213 identifies safety performance reporting requirements for State DOTs and MPOs. State DOTs establish and report their safety targets and progress toward meeting their safety targets in the annual HSIP report in accordance with 23 CFR part 924. As proposed in the NPRM, targets established by an MPO would be reported annually to their State DOT(s). The FHWA revises this section to require MPOs to report their established targets to the relevant State DOT(s) in a manner that is agreed upon and documented by both parties, rather than requiring the procedure be documented in the Metropolitan Planning Agreement. The MPOs report on progress toward the achievement of their targets in their System Performance Report as part of their transportation plan, in accordance with 23 CFR part 450.

### C. Costs and Benefits

The FHWA estimated the incremental costs associated with the new requirements in this rule that represent a change to current practices for State DOTs and MPOs. The FHWA derived the costs of each of these components by assessing the expected increase in level of effort from labor to standardize and

update data collection and reporting systems of State DOTs, as well as the increase in level of effort from labor to establish and report targets.

To estimate costs, FHWA multiplied the level of effort, expressed in labor hours, with a corresponding loaded wage rate that varied by the type of laborer needed to perform the activity. Following this approach the 10-year undiscounted incremental cost to comply with this rule is \$87.5 million.

The final rule's 10-year undiscounted cost (\$87.5 million in 2014 dollars) increased from the proposed rule (\$66.7 million in 2012 dollars). The FHWA made several changes which affected cost. These changes include updating costs to 2014 dollars from 2012 dollars and updating labor costs to reflect current Bureau of Labor Statistics (BLS) data. In addition, FHWA revised the final rule Regulatory Impact Analysis (RIA) to reflect (1) updated local law enforcement census data, (2) costs associated with establishing the new non-motorized fatalities and non-motorized serious injuries performance measure, (3) the removal of the proposed requirement for State DOTs to compile a 10-year historical trend line, (4) the deferred implementation of MMUCC, 4th edition compliance, (5) added effort required for MPOs to estimate MPO-specific VMT for performance targets, (6) a decrease in the number of MPOs expected to establish quantifiable targets, (7) costs of coordinating on the establishment of targets in accordance with 23 CFR part 450, (8) an increase in the estimated number of States that might not meet or make significant progress toward meeting their targets using the new methodology included in the final rule, and (9) a decrease in the number of years States that do not meet or make significant progress toward meeting their targets will incur costs.

The FHWA expects that the rule will result in some significant benefits, although they are not easily quantifiable. Specifically, FHWA expects the rule will allow for more informed decisionmaking at a regional, State, and Federal level on safety-related project, program, and policy choices. The rule will increase focus on investments that will help to reduce fatalities and serious injuries. The rule also will yield greater accountability on how States and MPOs are using Federal-aid highway funds because of the MAP-21 requirements for mandated reporting that will increase visibility and transparency.

The FHWA could not directly quantify the expected benefits discussed above due to data limitations and the

<sup>4</sup> The MAP-21 requires State Highway Safety Offices to use the "Traffic Safety Performance Measures for States and Federal Agencies" (DOT HS 811 025) to establish performance measures and targets in the HSP. The MAP-21 further requires NHTSA to coordinate with GHSA in making revisions to the performance measures identified in the report. Accordingly, any changes to the common performance measures, such as changes to the 5-year rolling average, are subject to the GHSA coordination requirement in MAP-21.



amorphous nature of the benefits from the rule. Therefore, FHWA used a break-even analysis as the primary approach to quantify benefits. The FHWA focused its break-even analysis on reduction in fatalities or serious injuries needed in order for the benefits of the rule to justify the costs. The results of the break-even analysis quantified the dollar value of the benefits that the rule must generate to outweigh the threshold value, the estimated cost of the rule, which is \$87.5 million in undiscounted

dollars. The results show that the rule must prevent approximately 10 fatalities, or 199 incapacitating injuries, over 10 years to generate enough benefits to outweigh the cost of the rule. The FHWA believes that the benefits of this rule will surpass this threshold and, as a result, the benefits of the rule will outweigh the costs.

Relative to the proposed rule, both of the break-even thresholds increased in the final rule. For both fatalities and incapacitating injuries, the break-even

points were affected by the increase in the undiscounted 10-year cost, as well as by an increase in the Value of Statistical Life (VSL) for fatalities, currently valued at \$9,200,000, and the average cost per incapacitating injury, currently valued at \$440,000.

The table below displays the Office of Management and Budget (OMB) A-4 Accounting Statement as a summary of the cost and benefits calculated for this rule.

#### OMB A-4 ACCOUNTING STATEMENT

Category	Estimates			Units			Source/citation
	Primary	Low	High	Year dollar	Discount rate	Period covered	
Benefits							
Annualized Monetized (\$ millions/year).	None .....	None .....	None .....	NA .....	7% .....	NA .....	Not Quantified.
Annualized Quantified .....	None .....	None .....	None .....	NA .....	3% .....	NA .....	Not Quantified.
	None .....	None .....	None .....	NA .....	7% .....	NA .....	
	None .....	None .....	None .....	NA .....	3% .....	NA .....	
Qualitative .....	The rule is cost-beneficial if over the 10-year analysis period it reduces the number of fatalities by 9.5 or the number of incapacitating injuries by 198.8, which is equivalently 1.0 fatality or 19.9 incapacitating injuries per year in a 10-year study period, from its current base case projection. Because of this low threshold, FHWA determines that the rule benefits outweigh the costs.						Final Rule RIA.
Costs							
Annualized Monetized (\$/year) .....	\$9,339,123	.....	.....	2014 .....	7% .....	10 Years .....	Final Rule RIA.
Annualized Quantified .....	\$9,015,871	.....	.....	2014 .....	3% .....	10 Years .....	Not Quantified.
	None .....	None .....	None .....	2014 .....	7% .....	10 Years .....	
	None .....	None .....	None .....	2014 .....	3% .....	10 Years .....	
Qualitative .....	None.						
Transfers .....	None.						
From/To .....	From:			To:			
Effects							
State, Local, and/or Tribal Government.	\$9,339,123	.....	.....	2014 .....	7% .....	10 Years .....	Final Rule RIA.
Small Business .....	\$9,015,871	.....	.....	2014 .....	3% .....	10 Years .....	Final Rule RIA.
	Not expected to have a significant impact on a substantial number of small entities.			NA .....	NA .....	NA .....	

## II. Acronyms and Abbreviations

#### ACRONYMS AND ABBREVIATIONS TABLE

AASHTO .....	American Association of State Highway and Transportation Officials.
AMBAG .....	Association of Monterey Bay Area Governments.
AMPO .....	Association of Metropolitan Planning Organizations.
ARC .....	Atlanta Regional Commission.
ARF .....	Annual Report File.
ATSSA .....	American Traffic Safety Services Association.
BLS .....	Bureau of Labor Statistics.
Caltrans .....	California Department of Transportation.
CFR .....	Code of Federal Regulations.
CODES .....	Crash Outcome Data Evaluation System.
CY .....	Calendar Year.
DOT .....	U.S. Department of Transportation.
DVRPC .....	Delaware Valley Regional Planning Commission.
EO .....	Executive Order.
FARS .....	Fatality Analysis Reporting System.
FAST Act .....	Fixing America's Surface Transportation Act.
FHWA .....	Federal Highway Administration.

ACRONYMS AND ABBREVIATIONS TABLE—Continued

FMCSA .....	Federal Motor Carrier Safety Administration.
FR .....	Federal Register.
FY .....	Fiscal Year.
GHSA .....	Governor Highway Safety Association.
HIPPA .....	Health Insurance Privacy and Portability Act.
HPMS .....	Highway Performance Monitoring System.
HSIP .....	Highway Safety Improvement Program.
HSP .....	Highway Safety Plan.
IBR .....	Incorporation by reference.
IFR .....	Interim Final Rule.
KABCO .....	K, killed; A, disabling injury; B, evident injury; C, possible injury; O, no apparent injury.
LAB .....	League of American Bicyclists.
MAP-21 .....	Moving Ahead for Progress in the 21st Century Act.
MARC .....	Mid-America Regional Council.
MIRE .....	Model Inventory of Roadway Elements.
MMUCC .....	Model Minimum Uniform Crash Criteria.
MPO .....	Metropolitan Planning Organizations.
NACCHO .....	National Association of County and City Health Officials..
NARA .....	National Archives and Records Administration.
NHTSA .....	National Highway Traffic Safety Administration.
NPRM .....	Notice of proposed rulemaking.
NTSB .....	National Transportation Safety Board.
NYMTC .....	New York Metropolitan Transportation Council.
NYSAMPO .....	New York State Association of Metropolitan Planning Organizations.
OMB .....	Office of Management and Budget.
PRA .....	Paperwork Reduction Act of 1995.
RIA .....	Regulatory Impact Analysis.
RIN .....	Regulatory Identification Number.
SANDAG .....	San Diego Association of Governments.
SBCAG .....	Santa Barbara County Association of Governments.
SCAG .....	Southern California Association of Governments.
SEMCOG .....	Southeast Michigan Council of Governments.
SHSO .....	State Highway Safety Office.
SHSP .....	Strategic Highway Safety Plan.
SRTA .....	Shasta Regional Transportation Agency.
SRTS .....	Safe Routes to Schools National Partnership.
State DOT .....	State Department of Transportation.
STIP .....	State Transportation Improvement Program.
STP .....	Surface Transportation Program.
TMA .....	Transportation Management Area.
TPM .....	Transportation Performance Management.
U.S.C. ....	United States Code.
VMT .....	Vehicle miles traveled.
VSL .....	Value of Statistical Life.

### III. Background

On March 11, 2014, at 79 FR 13846, FHWA published an NPRM proposing the following: the definitions that will be applicable to the new 23 CFR part 490; the process to be used by State DOTs and MPOs to establish their safety-related performance targets that reflect the measures proposed in the NPRM; a methodology to be used to assess State DOTs' compliance with the target achievement provision specified under 23 U.S.C. 148(i); and the process State DOTs must follow to report on progress toward meeting or making significant progress toward meeting safety-related performance targets. The NPRM also included a discussion of the collective rulemaking actions FHWA intends to take to implement MAP-21 performance-related provisions. On May 28, 2014, at 79 FR 30507, FHWA extended the comment period on the

NPRM from June 9, 2014, to June 30, 2014.

### IV. Summary of Comments

The FHWA received 13,269 letters to the docket, including letters from 38 State DOTs, 27 local government agencies, more than 50 associations and advocacy groups, over 13,000 individuals and consultants, various other government agencies as well as 1 letter cosigned by 8 U.S. Senators. The FHWA has also reviewed and considered the implications of the FAST Act on the Safety Performance Management Final Rule.

Of all the letters to the docket, 99 percent specifically addressed bicycle and pedestrian safety issues or the need for a non-motorized performance measure. The FHWA received more than 11,000 verbatim duplicates of a letter written by the League of American Bicyclists (LAB) or a copy of the letter

with additional commentary. Fifty-seven additional letters endorsed the LAB letter and provided additional comments. Smart Growth America submitted verbatim letters from 1,513 individuals and FHWA received 473 duplicate copies of letters supporting the Safety Routes to Schools National Partnership (SRTS) and 6 letters in support of America Walks. Another 84 letters from individuals provided comments focusing on bicycle/ pedestrian issues without reference to specific organization letters.

Of the State DOT letters, 27 either (a) specifically mentioned their general or strong support for the first of two letters that the American Association of State Highway and Transportation Officials (AASHTO) submitted to the docket, (b) identified that they assisted with writing portions of the first AASHTO letter and were in general agreement with AASHTO's letter; and/or (c) stated

that they agreed with the letter and had additional comments specific to their State. Those included: Alaska, Arkansas, Colorado, Connecticut, Florida, Georgia, Idaho, Illinois, Indiana, Iowa, Louisiana, Maine, Massachusetts, Michigan, Minnesota, Montana, New Jersey, New York, North Dakota, Ohio, Oklahoma, Oregon, Pennsylvania, Rhode Island, South Dakota, Utah, and Wyoming DOTs.

The FHWA carefully considered the comments received from the vast array of stakeholders. The comments, and summaries of FHWA's analyses and determinations, are discussed in the following sections.

#### *Selected Topics for Which FHWA Requested Comments*

In the NPRM, FHWA specifically requested comments or input regarding certain topics related to the safety performance measures rulemaking. Several of those have an overall impact on the regulatory language in this final rule, so are discussed in this section. The others are discussed in the Section-by-Section analysis.

#### *Effective Date*

In the NPRM, FHWA proposed to establish one common effective date for all three final rules for the performance measures established pursuant to 23 U.S.C. 150. The FHWA solicited comments on an appropriate effective date. While there were no comments suggesting a specific date, the American Traffic Safety Services Association (ATSSA) and Delaware DOT disagreed with the proposal for one effective date for all three rules for performance measures because fatalities and serious injuries are measured already, well known, and used in practice by virtually every State DOT. The commenters stated that especially with no firm timetable for the subsequent performance measure rulemakings, there is no reason to delay implementation of this congressional mandate to more effectively plan to save lives on our roadways. Michigan and Washington State DOTs and the Mid-America Regional Council (MARC) expressed support for one common effective date in order to reduce the burdens on States to manage multiple effective dates. Virginia DOT suggested that without knowing more about the other proposed performance measures it was premature to seek opinions on effective dates. Finally, in an Explanatory Statement accompanying the "Consolidated and Further Continuing Appropriations Act, 2015,"

published in the Congressional Record,<sup>5</sup> Congress directs FHWA to publish its final rule on safety performance measures no later than September 30, 2015.

While FHWA recognizes that one common effective date could be easier for State DOTs and MPOs to implement, the process to develop and implement all of the Federal-aid highway performance measures required in MAP-21 has been lengthy. It is taking more than 3 years since the enactment of MAP-21 to issue all three performance measure NPRMs (the first performance management NPRM was published on March 11, 2014; the second NPRM<sup>6</sup> was published on January 5, 2015; and the third performance management NPRM<sup>7</sup> is expected to be published soon). Rather than waiting for all three rules to be final before implementing the MAP-21 performance measure requirements, FHWA has decided to phase in the effective dates for the three final rules for these performance measures so that each of the three performance measures rules will have individual effective dates. This allows FHWA and the States to begin implementing some of the performance requirements much sooner than waiting for the rulemaking process to be complete for all the rules. This approach would also implement the safety-related measures and requirements in this rule before the requirements proposed in the other two rules. Earlier implementation of the safety-related requirements in this rule is consistent with a DOT priority to improve the safety mission across the Department.<sup>8</sup> The FHWA also believes that a staggered approach to implementation (*i.e.*, implementing one set of requirements at the onset and adding on requirements over time) will better help States and MPOs transition to a performance-based framework.

The FHWA believes that States are in a position to begin to implement the safety Transportation Performance Management (TPM) requirements now for several reasons. Since 2010, SHSO

have been establishing and reporting annual targets for safety performance measures. Since MAP-21 was enacted, FHWA and the NHTSA have encouraged State SHSOs to coordinate with State DOTs as their targets are established. States are familiar with the safety data sources necessary to establish their targets (FARS, State motor vehicle crash databases and HPMS) as these have been in place for many years. The FHWA documented in the NPRM its assessment that the safety measures were appropriate for national use and that FHWA was ready to implement the measures in an accurate, reliable, and credible manner, with a few gaps that were addressed in the NPRM. There were no comments countering this assessment. Although FHWA believes that individual implementation dates will help States and MPOs transition to performance based planning, to lessen any potential burden of staggered effective dates on States and MPOs, FHWA will provide guidance to States and MPOs on how to carry out the new performance requirements.

In addition to providing this guidance, FHWA is committed to providing stewardship to State DOTs and MPOs to assist them as they take steps to manage and improve the performance of the highway system. As a Federal agency, FHWA is in a unique position to utilize resources at a national level to capture and share strategies that can improve performance. The FHWA will continue to dedicate resources at the national level to provide technical assistance, technical tools, and guidance to State DOTs and MPOs to assist them in making more effective investment decisions. It is FHWA's intent to be engaged at a local and national level to provide resources and assistance from the onset to identify opportunities to improve performance and to increase the chances for full State DOT and MPO compliance of new performance related regulations. The FHWA technical assistance activities include conducting national research studies, improving analytical modeling tools, identifying and promoting best practices, preparing guidance materials, and developing data quality assurance tools.

#### *Principles Considered in the Development of the Regulations for National Performance Management Measures Under 23 U.S.C. 150(c)*

The FHWA listed nine principles in the NPRM preamble that were considered in the development of the

<sup>5</sup> Congressional Record, December 11, 2014, page H9978, <https://www.congress.gov/crc/2014/12/11/CRC-2014-12-11-bk2.pdf>.

<sup>6</sup> NPRM for the National Performance Management Measures; Assessing Pavement Condition for the National Highway Performance Program and Bridge Condition for the National Highway Performance Program 80 FR 326 (proposed January 5, 2015) <http://www.gpo.gov/fdsys/pkg/FR-2015-01-05/pdf/2014-30085.pdf>.

<sup>7</sup> NPRM for the National Performance Management Measures; Assessing Performance of the National Highway System, Freight Movement on the Interstate System, and Congestion Mitigation and Air Quality Improvement Program.

<sup>8</sup> <http://www.dot.gov/sites/dot.gov/files/docs/FY2016-DOT-BudgetHighlights-508.pdf>.



proposed regulation<sup>9</sup>. The FHWA encouraged comments on the extent to which the approach to performance measures set forth in the NPRM supported these principles. Commenters were supportive of both the principles and the approach to establishing the performance measures. The AASHTO, Connecticut DOT, and Tennessee DOT expressed support for the nine guiding principles, stating that they are appropriate and that the approaches set forth in the NPRM supported these guiding principles. The AASHTO suggested revisions seeking to clarify and underscore several of these principles, particularly providing flexibility to States in target establishment and ensuring adequate time to phase in requirements. Connecticut DOT echoed the need for flexibility in target establishment and phase in time. The New York State Association of Metropolitan Planning Organizations (NYSAMPO) expressed overall agreement with the principles and indicated that the proposed safety

performance measure rule generally meets the intent of these principles. This commenter did, however, suggest that the NPRM did not fully realize the opportunity for “increased accountability and transparency” as it relates to the proposed methodology for determining whether States are making significant progress toward their performance targets and suggested this could be a “black box” analysis meant to obscure rather than inform. In addition, the NYSAMPO stated that it was not clear how the NPRM demonstrates an “understanding that priorities differ.” For example, improving safety in terms of reducing deaths and injuries for all users should be a high priority of both State DOTs and MPOs, but priorities may differ on modal issues, and trade-offs may need to be made with other national goals in a highly constrained funding environment.

Letters organized by Smart Growth America suggested that the proposed rulemaking did not meet the congressional intent of MAP-21. The commenters stated that without real targets and clearly defined measures of success, the proposed rules do not provide the necessary motivation to improve safety and reduce the number of fatalities and serious injuries suffered by motorized and non-motorized users.

The FHWA appreciates the comments on the guiding principles. Based on the general support of the principles, FHWA retains the principles in the development of this final rule. As outlined in the section-by-section discussion below, FHWA has made revisions to portions of the regulation to more closely match the principles, including adding an additional performance measure and the timing and methodology of the assessment of whether a State has met or made significant progress toward meeting its targets. The FHWA addresses AASHTO and Connecticut DOT concerns about providing flexibility to States in target establishment in the § 490.209 discussion of identical targets. In response to the NYSAMPO’s comment on the principle of “understanding that priorities differ” and that States and MPOs need to make trade-offs, FHWA believes that this issue applies to the entire performance management program, not just this rule. The FHWA provides State DOTs and MPOs flexibilities to make performance trade-offs as they make target establishment and programming decisions in FHWA proposals for 23 CFR part 490.<sup>10</sup> The

“Statewide and Nonmetropolitan Transportation Planning; Metropolitan Transportation Planning” NPRM (Planning NPRM)<sup>11</sup> further supports this principle because, as described in that proposal, the planning process brings all of the elements of a performance management framework (such as establishment of performance measures and targets and reporting requirements) together by linking decisionmaking and investment priorities to performance targets in areas like safety, infrastructure condition, traffic congestion, system reliability, emissions and freight movement. Trade-offs and establishing local and regional priorities are key elements of the TPM framework and a performance based planning process.

#### Separate Non-Motorized Performance Measures

In developing the NPRM, FHWA considered input from numerous sources in selecting the proposed measures to carry out the HSIP and for State DOTs and MPOs to use to assess safety performance. In the NPRM, FHWA explained that it received information from stakeholders before publishing the NPRM through listening sessions and letters, in which the stakeholders suggested that: FHWA account for the safety of all road users by including separate measures for motorized and non-motorized (*e.g.*, pedestrian, bicycle) transportation; that FHWA should define performance measures that specifically evaluate the number of fatalities and serious injuries for pedestrian and bicycle crashes; and that FHWA should require that bicycle and pedestrian crashes and fatalities be reported nationally and by States and MPOs. In addition, following the passage of MAP-21 and before the issuance of the NPRM, 15 Senators and 77 Members of the House of Representatives submitted letters to the Secretary of Transportation that expressed concern over rising bicyclist and pedestrian fatalities and suggested separate measures for motorized and non-motorized transportation should be established.

Condition for the National Highway Performance Program and Bridge Condition for the National Highway Performance Program 80 FR 326, <http://www.gpo.gov/fdsys/pkg/FR-2015-01-05/pdf/2014-30085.pdf> and future proposed rulemaking regarding National Performance Management Measures; Assessing Performance of the National Highway System, Freight Movement on the Interstate System, and Congestion Mitigation and Air Quality Improvement Program.

<sup>11</sup> The Statewide and Nonmetropolitan Transportation Planning; Metropolitan Transportation Planning NPRM: <http://www.regulations.gov/#/documentDetail;D=FHWA-2013-0037-0001>.

<sup>9</sup> Nine principles used in the development of proposed regulations for national performance management measures under 23 U.S.C. 150(c), [www.regulations.gov](http://www.regulations.gov), Docket FHWA–2013–0020:

- Provide for a National Focus—focus the performance requirements on outcomes that can be reported at a national level.
- Minimize the Number of Measures—identify only the most necessary measures that will be required for target establishment and progress reporting. Limit the number of measures to no more than two per area specified under 23 U.S.C. 150(c).
- Ensure for Consistency—provide a sufficient level of consistency, nationally, in the establishment of measures, the process to set targets and report expectations, and the approach to assess progress so that transportation performance can be presented in a credible manner at a national level.
- Phase in Requirements—allow for sufficient time to comply with new requirements and consider approaches to phase in new approaches to measuring, target establishment, and reporting performance.
- Increase Accountability and Transparency—consider an approach that will provide the public and decisionmakers a better understanding of Federal transportation investment needs and return on investments.
- Consider Risk—recognize that risks in the target establishment process are inherent, and that performance can be impacted by many factors outside the control of the entity required to establish the targets.
- Understand that Priorities Differ—recognize that State DOTs and MPOs must establish targets across a wide range of performance areas, and that they will need to make performance trade-offs to establish priorities, which can be influenced by local and regional needs.
- Recognize Fiscal Constraints—provide for an approach that encourages the optimal investment of Federal funds to maximize performance but recognize that, when operating with scarce resources, performance cannot always be improved.
- Provide for Flexibility—recognize that the MAP-21 requirements are the first steps that will transform the Federal-aid highway program to a performance-based program and that State DOTs, MPOs, and other stakeholders will be learning a great deal as implementation occurs.

<sup>10</sup> NPRM for the National Performance Management Measures; Assessing Pavement

The FHWA did not propose separate motorized and non-motorized performance measures in the NPRM, but requested comments on how DOT could address non-motorized performance measures in the final rule. In addition, FHWA requested input on the extent to which States and MPOs currently collect and report non-motorized data and the reliability and accuracy of such data, and how States and MPOs consider such data in their safety programs and in making their investment decisions. The FHWA desired to hear from stakeholders how non-motorized performance measures could be included in the final rule to better improve safety for all users.

The majority of the comment letters submitted to the docket can be directly attributed to the question of whether to include a non-motorized performance measure. The AASHTO and 23 State DOTs objected to creating a separate performance measure for non-motorized users. The AASHTO commented that safety measures should focus on all fatalities and serious injuries and not on emphasis areas, such as those for separate non-motorized users. Twenty-three States submitted letters to the docket either supporting AASHTO's comments or expressing individual objections to the separate inclusion of non-motorized measures: Alaska, California, Connecticut, Delaware, Florida, Georgia, Indiana, Iowa, Kentucky, Maine, Michigan, Minnesota, Missouri, Montana, New Jersey, North Dakota, Pennsylvania, Rhode Island, South Dakota, Tennessee, Texas, Vermont, and Utah. The AASHTO and these States suggested that focusing performance measures on a particular group, such as non-motorized users, would limit States' ability to use a comprehensive evaluation strategy and data-driven approach to determine where the investment of limited resources can most effectively save lives and reduce serious injuries. The AASHTO and Delaware, Iowa, Kentucky, Michigan, Minnesota, Montana, and Vermont DOTs, as well as the California State Association of Counties, objected to a separate performance measure because non-motorized users are already addressed in the HSP that SHSOs submit to NHTSA and which includes analyses of non-motorized (pedestrian and bicyclists) fatalities. They indicated that the emphasis on non-motorized safety should remain in the HSP, which allows each State to focus on its individual safety problems, while minimizing the number of performance measures in the HSIP that require target establishment,

measurement, and reporting. Delaware and Minnesota DOTs noted that introducing additional performance measures would conflict with the second principle used to develop the proposed performance management regulations (*i.e.*, to minimize the number of measures). The AASHTO also noted that the option to require a non-motorized performance measure would be counter to several of the principles used to develop the performance measures, namely, to minimize the number of measures, understand that priorities differ, and provide for flexibility. The AASHTO, along with the Florida, Michigan, Montana, North Dakota, and Vermont DOTs argued that expanding performance measures by segregating specific types of fatalities and serious injuries at the national level would be inappropriate and contrary to MAP-21 and against States' desire to focus national performance efforts on a limited number of measures to implement 23 U.S.C. 150. Finally, many of these same commenters, as well as Texas DOT, pointed out that non-motorized exposure data are not sufficient to support these measures.

The Michigan DOT and AASHTO each submitted a letter after the close of the comment period, in reaction to the Explanatory Statement accompanying the "Consolidated and Further Continuing Appropriations Act, 2015." These letters re-iterated earlier AASHTO comments, emphasizing that performance measures should not focus on particular issues, which would limit States' ability to use a comprehensive, data driven approach to improving safety; any non-motorized performance measure should be based on currently available data-counts of non-motorist fatalities and serious injuries that occur on public roadways and involve a motor vehicle; and non-motorized performance measures should not be included in the assessment of whether a State has met or made significant progress toward meeting its performance targets. Michigan DOT also suggested that if a non-motorized performance measure were required, fatality data should be combined with serious injury data to reduce the volatility of small data sets.

However, 99 percent of the letters submitted to the docket supported a non-motorized performance measure. Commenters who expressed support included letters organized by the LAB (11,175 commenters in general agreement), Smart Growth America (1,513 identical letters), and the SRTS (467 letters); as well as letters from Transportation for America, ATSSA,

AARP, the American Heart Association, and 3 State DOTs (Oregon, Virginia, and Washington State). The Regional Transportation Council and the North Central Texas Council of Governments, Puget Sound MPO, Metropolitan Planning Organization for Portland, Oregon, and Fairbanks Metropolitan Area Transportation System all expressed support for a process to establish performance measures for non-motorized travel. These commenters expressed concern that while total roadway fatalities have been in decline over the past decade, non-motorized fatalities have been on the rise. Moreover, supporters of a non-motorized performance measure noted in their comments to the docket, that in 2012, 16 percent of all national roadway fatalities were non-motorized users and claim that less than 2 percent of HSIP funds were obligated on non-motorized projects. Specifically, the LAB, Smart Growth America, SRTS, Transportation Choices Coalition, Idaho Walks, Adventure Cycling, Washington Bikes, the National Association of Realtors, AARP, the National Association of County and City Health Officials (NACCHO), other advocacy groups and their supporters, and Nashville MPO believe Congress amended the HSIP in MAP-21 to clearly support projects, activities, plans, and reports for non-motorized safety. They state, for example, the HSIP was amended in MAP-21, in 23 U.S.C. 148(c)(2)(A)(vi) to improve the collection of data on non-motorized crashes, and 23 U.S.C. 148(d)(1)(B) requires that States address motor vehicle crashes that involve a bicyclist or pedestrian. The commenters concluded that HSIP funding is explicitly eligible for projects addressing the safety needs of bicyclists and pedestrians. The LAB comments addressed the concern in the NPRM that there may be "too few" recorded non-motorized fatalities to make a performance measure statistically valid or useful by noting that in 3 out of 5 States, non-motorized fatalities already make up more than 10 percent of their total fatalities.

Supporters of SRTS letters note that children and families should have the option to safely walk or bicycle to and from school, yet too many communities lack the basic infrastructure necessary to make that choice safe or possible. They argue that non-motorized measures would lead to improvements in this area, and, without this change, States will continue to overlook bicycle and pedestrian deaths, continue to spend HSIP funds nearly exclusively on motorized safety issues, and bicycle and



pedestrian deaths will continue to rise year after year. The Smart Growth America comments suggest that although data are not perfect, States already track non-motorized crashes and establishing targets would support significant safety improvements in the coming years.

A group of eight U.S. Senators also submitted a letter to the Secretary of Transportation expressing concern that the NPRM did not propose a measure for non-motorized users and encouraging the DOT to reevaluate the NPRM to address the safety of all public road users in the final rule by creating separate measures for motorized and non-motorized road users. Finally, the Explanatory Statement accompanying the “Consolidated and Further Continuing Appropriations Act, 2015,” published in the Congressional Record,<sup>12</sup> directs FHWA to “establish separate, non-motorized safety performance measures for the [HSIP], define performance measures for fatalities and serious injuries from pedestrian and bicycle crashes, and publish its final rule on safety performance measures no later than September 30, 2015.”

The FHWA includes in this final rule a non-motorized safety performance measure. This measure is established after considering a broad range of alternatives to address non-motorized safety, while maintaining the data-driven nature of the HSIP and the TPM program overall.

For example, FHWA considered a requirement for States to simply report on non-motorized safety without further comment or evaluation. This requirement would meet the concerns of AASHTO and many State DOTs by not adding another performance measure and has the advantage of keeping the regulatory requirement for non-motorized transportation safety simple. The FHWA concluded, however, that requiring States only to report would not improve non-motorized transportation safety, particularly since, beginning with the Fiscal Year (FY) 2015 HSPs, States must include an additional core outcome measure and establish targets for bicycle fatalities<sup>13</sup> (complementing the core outcome measure and targets for the number of

pedestrian fatalities measure, which has been included in the HSPs since FY 2010). Reporting non-motorized performance data in the HSIP reports would provide a visible, publicly accessible platform to demonstrate the progress States are making in improving non-motorized transportation safety. However, reporting alone will not result in the same level of accountability as performance targets. The FHWA believes any requirement should go beyond reporting, particularly since much of the information is already available in HSP reports, to have an impact on how infrastructure investment decisions are made in this performance area. As a result, a requirement for States to only report non-motorized performance data, without further comment or evaluation, is not adopted in the final rule.

The FHWA is aware that the magnitude and characteristics of non-motorized safety performance varies from State to State. Each State uses a data-driven approach to consider and account for its particular safety issues in its SHSP. Twenty-five States included pedestrians, bicyclists and/or vulnerable road users as emphasis areas in their SHSPs as of 2014. Therefore, FHWA contemplated establishing a threshold to identify only those States where non-motorized safety performance supports requiring a State to focus additional attention and action on non-motorized safety. The FHWA considered how to make the threshold data-driven so that a State in which non-motorized safety problems are not particularly high could focus attention and resources on aspects of safety that its data indicate is most important, but would require some States to establish targets for non-motorized safety. The FHWA considered a number of methodologies for establishing the threshold, including: (a) The national average of non-motorized fatalities, (b) the percent of a State's total fatalities and serious injuries, and (c) the non-motorized fatality rate by population. The FHWA also considered exempting States that demonstrated improvements in past non-motorized safety performance from assessment of the measure. Ultimately, FHWA determined that each methodology for establishing a threshold could be subject to criticism because the threshold is either too high—so not enough States are required to take action—or too low—including too many States. In keeping with FHWA's principle articulated in the NPRM to “ensure for consistency,” FHWA does not include a threshold to

avoid different requirements for different States.

After reviewing the comments and information received that addressed the questions in the NPRM on how DOT could address a non-motorized performance measure, FHWA establishes in this final rule an additional safety performance measure: the number of combined non-motorized fatalities and non-motorized serious injuries in a State. This performance measure is not identical to the measures in the HSP, as the HSP includes separate measures for the number of pedestrian fatalities and the number of bicycle fatalities. The single non-motorized performance measure included in this final rule will be treated equal to the other 4 measures proposed in the NPRM and included in this final rule: (1) Total number of fatalities; (2) rate of all fatalities per 100 million VMT; (3) total number of serious injuries; and (4) rate of all serious injuries per 100 million VMT. All five safety performance measures are subject to the requirements of this rule, including establishing targets, reporting, and FHWA's assessment of whether a State has met or made significant progress toward meeting its targets.

The FHWA establishes the additional non-motorized performance measure to accomplish a number of objectives:

1. Encourage all States to address pedestrian and bicycle safety;
2. Recognize that walking and biking are modes of transportation with unique crash countermeasures distinct from motor vehicles; and
3. Address the increasing trend in the total number of pedestrian and bicyclist fatalities in the United States. These fatalities have shown a 15.6 percent increase from 4,737 in 2009 to 5,478 in 2013. In addition, the percentage of total fatalities involving non-motorists has increased from 13.3 percent in 2005 to 17.1 percent in 2013.<sup>14</sup>

Furthermore, establishing an additional non-motorized performance measure supports President Obama's ‘Ladders of Opportunity’<sup>15</sup> priority. The Ladders of Opportunity program at DOT helps ensure that the transportation system provides reliable, safe, and affordable options for reaching jobs, education, and other essential services.<sup>16</sup> As part of DOT's program, the Secretary of Transportation has an initiative that focuses on making streets and communities safer for residents that do not or cannot drive. Through this

<sup>14</sup> <http://www.nhtsa.gov/FARS>.

<sup>15</sup> <http://www.whitehouse.gov/issues/urban-and-economic-mobility>.

<sup>16</sup> <http://www.dot.gov/briefing-room/secretary-foxx-announces-ladderstep-technical-assistance-program>.

<sup>12</sup> Congressional Record, December 11, 2014, page H9978, <https://www.congress.gov/crc/2014/12/11/CREC-2014-12-11-bk2.pdf>.

<sup>13</sup> An additional core outcome measure for bicycle fatalities was added after NHTSA's publication of the Interim Final Rule (Uniform Procedures for State Highway Safety Grant Programs, Interim final rule, 78 FR 4986 (January 23, 2013) (to be codified at 23 CFR part 1200)), and is available at <http://www.ghsa.org/html/resources/planning/index.html>.



initiative, DOT encourages transportation agencies to consider the needs and safety of pedestrians and bicyclists when planning highways. Establishing a non-motorized performance measure is consistent with these priorities and initiatives as it focuses more attention on transportation safety problems for some of those residents that do not or cannot drive.<sup>17</sup> It is also consistent with the Explanatory Statement accompanying the “Consolidated and Further Continuing Appropriations Act, 2015.”

The addition of a non-motorized performance measure addresses the concerns of the majority of comments to the NPRM by requiring all States and MPOs to establish targets for non-motorized safety. It adds only one additional performance measure to the required set of safety measures, thereby still limiting the overall total number of measures, addressing a concern of AASHTO and some State DOTs. As part of the overall TPM framework, this additional performance measure increases the accountability and transparency of the Federal-aid highway program and allows for improved project decisionmaking with respect to

non-motorized safety. The data used for this additional measure address State DOTs’ and FHWA’s concern about small numbers of non-motorized fatalities in some States by combining non-motorized fatalities and serious injuries together in one measure. The combined total of non-motorized fatalities and serious injuries is not insignificant in any State. This approach is supported by Michigan DOT’s comments submitted after the close of the comment period. A single combined non-motorized fatality and serious injury performance measure reduces the additional burden for States and MPOs compared to two separate non-motorized performance measures.

The AASHTO and supporters of AASHTO’s comments on this issue indicated that adding non-motorized performance measures to the overall safety performance measures could limit a State’s ability to use a data-driven approach to decide where to invest limited resources and could distort the analysis of whether a State met or made significant progress toward meeting its non-motorized safety targets, since these fatalities and serious injuries would be counted in both sets of performance

measures. The FHWA disagrees. The additional combined non-motorized fatality and serious injury performance measure will not “double count” non-motorized fatalities and serious injuries or distort the assessment of whether a State has met or made significant progress toward meeting its targets. Because this performance measure combines fatalities and serious injuries, it is different from the other safety performance measures. For example, when the number of non-motorized serious injuries increases in a State, the total number and rate of serious injuries may or may not increase as well. The impact of the increase in non-motorized serious injuries will be different on each of the three performance measures that include serious injuries: The number of serious injuries; the rate of serious injuries; and, the number of non-motorized fatalities and non-motorized serious injuries. The example below illustrates this point using data from Kansas (Table 1). The Kansas data are drawn from FARS, NHTSA’s State Data System<sup>18</sup> (for serious injury data), and HPMS.

TABLE 1—KANSAS FATALITY AND SERIOUS INJURY DATA

Annual data	2005	2006	2007	2008	2009	2010	2011	2012
Non-Motorized Serious Injuries .....	105	98	91	79	88	95	97	104
Non-Motorized Fatalities .....	28	29	22	25	27	16	16	33
Total Non-Motorized Fatalities & Serious Injuries .....	133	127	113	104	115	111	113	137
Total Serious Injuries .....	1,874	1,746	1,811	1,709	1,670	1,717	1,581	1,592
Total Serious Injury Rate .....	6.33	5.78	6.03	5.75	5.66	5.74	5.27	5.21
VMT (per 100 Million) .....	296.21	302.15	300.48	297.27	294.97	299.00	300.21	305.72
5-Year rolling average data				2005–2009	2006–2010	2007–2011	2008–2012	
Non-Motorized Fatalities & Serious Injuries .....				118.4	114.0	111.2	116.0	
% Change .....					–3.72%	–2.46%	4.32%	
Total Serious Injuries .....				1,762.0	1,730.6	1,697.6	1,653.8	
% Change .....					–1.78%	–1.91%	–2.58%	
Total Serious Injury Rate .....				6.327	5.779	6.027	5.749	
% Change .....					–8.66%	4.30%	–4.61%	

In this example, the number of combined non-motorized fatalities and non-motorized serious injuries increases from the 2007–2011 5-year rolling average to the 2008–2012 average. In the same time frame, the serious injury number and serious injury rate measures both decrease. States will need to consider how their programs, projects, and strategies will impact the number of non-motorized serious injuries and factor that impact into their

methodology for establishing their safety performance targets each year.

As noted in the comments by AASHTO and supporters of the AASHTO comments, FHWA recognizes that fatal and serious injury crashes involving only non-motorists (e.g., a bicyclist crashing into a pedestrian) are not included in FARS or many State motor vehicle crash databases. There is no single national or State-by-State data source that includes fatal or serious

injury crashes only involving non-motorists. Because FARS and the State motor vehicle crash databases already exist and are the data sources for the other safety performance measures, FHWA uses them as the data sources for the non-motorized performance measure. The FHWA recognizes that the calculation for the non-motorized performance measure may not include a small number of fatal and serious injury crashes involving only non-motorists

<sup>17</sup> Safer People, Safer Streets: Summary of U.S. Department of Transportation Action Plan to Increase Walking and Biking and Reduce Pedestrian

and Bicyclist Fatalities, September 2014, [http://www.dot.gov/sites/dot.gov/files/docs/safer\\_people\\_safer\\_streets\\_summary\\_doc\\_acc\\_v1-11-9.pdf](http://www.dot.gov/sites/dot.gov/files/docs/safer_people_safer_streets_summary_doc_acc_v1-11-9.pdf).

<sup>18</sup> <http://www.nhtsa.gov/Data/State+Data+Programs/SDS+Overview>.

because FHWA is relying on these data sources. The AASHTO comments submitted after the close of the comment period support using FARS and State motor vehicle crash databases as the source for any potential non-motorized safety performance measure data, since other crashes may not be recorded. The AASHTO's position on this issue is thus consistent with the requirement in this rule.

The FHWA recognizes that non-motorized fatalities and non-motorized serious injuries will now be accounted for in more than one performance measure; however, FHWA believes that establishing this separate performance measure for the number of non-motorized fatalities and serious injuries will help States focus greater attention on the safety needs of these transportation users, can be accounted for in how the States and MPOs evaluate their data and select their investment priorities, and will contribute to decreases in the total number of fatalities and serious injuries.

The Consortium for People with Disabilities and America Walks suggested that FHWA consider including non-motorized and motorized wheelchairs and other mobility devices such as scooters in a performance measure. The FHWA agrees and defines the non-motorized performance measure to include the categories of persons classified as pedestrians and bicyclists as well as those using motorized and non-motorized wheelchairs and personal conveyances. The definition of the non-motorized performance measure is also consistent with 23 U.S.C. 217(j) which defines 'pedestrian' as ". . . any person traveling by foot and any mobility impaired person using a wheelchair" and defines 'wheelchair' as "a mobility aid, usable indoors, and designed for and used by individuals with mobility impairments, whether operated manually or motorized."

The 23 U.S.C. 150 stipulates that the Secretary establish "measures for States to use to assess serious injuries and fatalities per VMT." The Atlanta Regional Commission (ARC), State of New York Department of Transportation, NYSAMPO, and several individuals commented that VMT is the wrong exposure variable for a rate-based measure for non-motorized modes. The New York agencies suggested that FHWA commence a research effort to determine the most appropriate method for calculating non-motorized based crash rates. Tennessee DOT indicated that it does not collect miles traveled for non-motorized users; however, some MPOs in Tennessee collect this information. Tennessee cautioned that

this could cause unbalanced and nonmatching targets or goals. The MARC commented that it disaggregates crash data by non-motorized type through work with its regional transportation safety coalition. The MARC also indicated that it currently works with its State DOTs to collect and report non-motorized fatality and serious injury data and to obtain motorized VMT, but do not have similar rate data for non-motorized travel. Oregon and New York City DOT expressed support for creation of a non-motorized safety performance measure that would count the rate of fatalities for bicyclists and pedestrians compared to population, not VMT. The LAB, Smart Growth America, and other supporters of a non-motorized performance measure recognize that there is no national dataset for a non-motorized rate measure. These commenters argued that adopting a non-motorized safety performance measure would create the expectation and incentive to collect this data. The Michigan DOT and AASHTO, in comments submitted after the close of the comment period, reiterated that a rate-based measure for non-motorized users is not appropriate at this time.

The FHWA agrees that VMT is not an appropriate exposure metric for a non-motorized performance measure and that there is no consensus on a national or State-by-State data source for bicycling and walking activity upon which to determine a rate in this rule. As a result, FHWA does not include a rate-based non-motorized measure at this time. The DOT is committed to improving the quality of data on non-motorist transportation and is engaged in a broad range of data-related activities concerning non-motorist transportation.<sup>19</sup> This work, such as including guidance for collecting pedestrian and bicyclist count information in the most recent FHWA *Traffic Monitoring Guide*,<sup>20</sup> should help pave the way for better methods to estimate exposure to risk for pedestrians and bicyclists. The FHWA encourages States and MPOs to use these resources in order to develop and use exposure measures for non-motorized travel that will inform pedestrian and bicycle safety initiatives.

#### Met or Made Significant Progress Toward Meeting Targets Evaluation

In the NPRM, FHWA proposed a two-step process for determining whether a State met or made significant progress

toward meeting its performance targets. The first step was to determine if each performance target had been met or if a State had made significant progress toward meeting each target based on a prediction interval around the projection of a historical trend line. The second step determined if a State had met or made significant progress toward meeting at least 50 percent of its performance targets, including optional targets. If they did, a State would be determined to have made "overall significant progress." The FHWA specifically asked stakeholders to comment on the appropriateness of the trend line and prediction interval methodologies and whether 50 percent is the appropriate threshold for determining if a State had "overall made significant progress" toward meeting its performance targets.

The FHWA has evaluated the arguments made by commenters regarding the methodology for assessing whether a State DOT made significant progress, including the comment discussed earlier that the proposed methodology conflicted with the "increased accountability and transparency" principle, and has concluded that it is necessary and appropriate to revise this part of the regulation. The following summarizes the comments regarding the proposed significant progress methodology. In response to the comments below, FHWA developed a set of criteria to help develop and evaluate the methodology for assessing whether a State DOT made significant progress toward meeting its targets.

The AASHTO, New York Metropolitan Transportation Council, NYSAMPO, ARC, and Transportation for America expressed disagreement with what they considered to be a complex method for determining significant progress. Eight U.S. Senators, AARP, Adventure Cycling, ATSSA, America Walks, Boston Public Health Commission, California Walks, Living Streets Alliance, Rails-to-Trails Conservancy, Smart Growth America and SRTS and their supporters, Transportation for America, Tri-State Transportation Campaign (New York, New Jersey and Connecticut), and Walk Austin were among the commenters who suggested that States should be held to a higher level of accountability than meeting 50 percent of their targets for the "overall significant progress" determination proposed in the NPRM. The AASHTO, Delaware Valley Regional Planning Commission (DVRPC), NYSAMPO, Shasta Regional Transportation Agency (SRTA), and Delaware, Connecticut, Iowa, Kentucky,

<sup>19</sup> Information about on-going USDOT activities is available at <http://www.dot.gov/bicycles-pedestrians>.

<sup>20</sup> FHWA "Traffic Monitoring Guide": <http://www.fhwa.dot.gov/policyinformation/tmguid/>.

Missouri, New York, Ohio, Oregon, Pennsylvania, and Vermont State DOTs agreed with the 50 percent threshold; while MARC and Arkansas, Illinois, Louisiana, New York, Pennsylvania, and South Dakota DOTs specifically expressed a desire to account for unique or extenuating circumstances. The ATSSA, NACCHO, Smart Growth America, Transportation Choices Coalition, and Transportation for America argued that meeting only 50 percent of targets is not stringent enough and expressed strong support for significant progress to be defined as meeting at least 75 percent of targets. Further, this group of commenters called for a methodology that is simplified, not based on historical trend lines, and that holds States more accountable for reducing fatalities and serious injuries by not including a cushion for States that fail to meet or make significant progress toward meeting their targets. The AARP, America Walks, BikeWalkLee, Boston Public Health Commission, Idaho Walk Bike Alliance, LAB, Lebanon Valley Bicycle Coalition, Living Streets Alliance, Rails-to-Trails Conservancy, SRTS, Trailnet, Trust for America's Health, Walk Austin, and their supporters also argued that significant progress should not include outcomes that result in an increase in the number or rate of fatalities or of serious injuries. The FHWA agrees that the methodology should hold States to a high level of accountability. The methodology should also avoid determining that significant progress was made when the number or rate of fatalities or of serious injuries increased. The methodology must also support the national safety goal to achieve a significant reduction in fatalities and serious injuries.

The AASHTO, Arkansas, Colorado, Michigan, Missouri, Montana, New York, Ohio, Oklahoma, Oregon, Rhode Island, Texas, Utah State DOTs, Fairbanks Metropolitan Area Transportation System, Nashville MPO, NACCHO, and NYSAMPO, as well as the Association of Metropolitan Planning Organizations (AMPO), Smart Growth America and Transportation Choices Coalition commented that the determination of significant progress should not be based on historical trends. The FHWA agrees that the methodology should not be based on historical trends and should be associated with the targets the State establishes.

The AASHTO and Kentucky, Ohio, Oregon, and Rhode Island DOTs also advocated that the significant progress methodology should not discourage States from establishing aggressive targets and that the process should be

flexible so as to not unduly impose the "penalty." The FHWA agrees that the methodology should not discourage aggressive targets.

The ATSSA, Delaware, Kentucky, and Washington State DOTs expressed support for the prediction interval, with Washington State DOT citing that it is necessary and appropriate to account for the normal variance in crashes. The AARP, ARC, Trust for America's Health, several bicycling and walking organizations including America Walks, LAB, Lebanon Valley Bicycle Coalition, BikeWalkLee, Trailnet, and Idaho Walk Bike, the Tri-State Transportation Campaign Alliance (New York, New Jersey and Connecticut), and New York, Oregon, and Virginia DOTs expressed opposition to the prediction interval analysis proposed in the NPRM, stating that it was too complex, too confusing, or provided too great a cushion for States to not meet a target. The FHWA agrees that the prediction interval is too complex and that the methodology should be simple, understandable, and transparent.

Based on these comments, FHWA developed criteria to evaluate methodologies to assess whether a State met or made significant progress toward meeting its targets. The methodology should: (a) Hold States to a higher level of accountability; (b) not discourage aggressive targets; (c) support the national goal to achieve a significant reduction in fatalities and serious injuries; (d) be fair and consistent/quantitative; (e) be simple, understandable, and transparent; (f) not be based on historical trends; and (g) be associated with the targets. The FHWA believes that using these criteria to develop a revised methodology to assess whether a State has met or made significant progress toward meeting its targets results in an approach that addresses the commenters' concerns.

With these criteria in mind, FHWA considered several options to determine whether a State has met or made significant progress toward meeting its targets: (1) State meets a defined range around each target; (2) State meets a range around a trend line for the performance measure; (3) State uses their own pre-determined and approved methodology; (4) State meets some percentage of all targets; and (5) State performs better than a baseline for a performance measure. Some of these methodologies were submitted to the docket.

First, FHWA eliminated the first and second options that would allow a State to meet a range around a target or a range around a trend line. Developing a range around targets or a trend line, as

was proposed in the NPRM, would require FHWA to define the range and evaluate States using complex mathematical analyses. Such an effort was strongly criticized and would not be consistent with the preference for a simpler methodology.

Arkansas, Colorado, and Michigan State DOTs suggested that they should be able to develop their own methodology for assessing whether a target was met or significant progress was made. To meet the principle "to ensure for consistency," FHWA did not consider the third option where it would use a different methodology for each State. However, FHWA did evaluate a variation of the third option that would allow States to select a methodology from a suite of options approved by FHWA. The State's selected methodology would be approved by FHWA in much the same manner as FHWA approves a State's definition for "high risk rural roads" in the High Risk Rural Roads Special Rule (23 U.S.C. 148(g)). The FHWA carefully weighed this option against the criteria. This option does not seem to disincentivize States from setting aggressive targets and could incentivize some States to establish even more aggressive targets if the methodology were to reduce the risk of States failing to make significant progress. This option, however, does not necessarily further the national goal to significantly reduce traffic fatalities and serious injuries. This option also does not meet the criteria for being simple/understandable/transparent since it would be difficult, if not impossible, for the general public to follow the different methodologies and related assessments for each State. Lastly, it would not be possible for FHWA to tell a "national story" if States were to use different significant progress methodologies—contrary to one of FHWA's principles considered in the development of these regulations.<sup>21</sup> For these reasons, FHWA did not adopt this option in the final rule.

The FHWA considered the fourth option—State meets some percentage of all targets—to be viable. This option is simple and was recommended by several commenters, including AASHTO, nine State DOTs, DVRPC, SRTA, NYSAMPO, ATSSA, NACCHO, Smart Growth America, and Transportation for America. This option is easy to understand and implement, does not require a complex

<sup>21</sup> NPRM for the National Performance Management Measures; Highway Safety Improvement Program 79 FR 13846, 13852 (proposed March 11, 2014) <http://www.gpo.gov/fdsys/pkg/FR-2014-03-11/pdf/2014-05152.pdf>.



mathematical analysis, and does not require 10 years of historical data (which some States commented would be difficult to obtain). Further, this option is clearly associated with the targets the State establishes and is not based on the historical trend in the State. Accordingly, FHWA concluded that it is appropriate to assess whether a State has met or made significant progress toward achieving its targets based on the State meeting or making significant progress toward meeting a defined percentage of its targets.

In further considering the fourth option, FHWA evaluated the responses to the NPRM request for comments on whether 50 percent is the appropriate threshold for determining whether a State has overall achieved or made significant progress toward achieving its performance targets. The FHWA agrees with the commenters who stated that the 50 percent threshold is too low. The AARP suggested that States be required to meet all targets. Transportation for America, Nashville MPO, NACCHO, Smart Growth America, Transportation Choices Coalition, and Ryan Snyder Associates also suggested that 100 percent of targets should be met, but recognized that some flexibility should be provided.

The MAP-21 requires the Secretary to make a determination whether a State has “met or made significant progress toward meeting” its targets.<sup>22</sup> To satisfy this mandate, FHWA has determined that States must meet or make significant progress toward meeting four out of five targets. (The addition of the non-motorized performance measure in this final rule expands the number of required performance targets from the four proposed in the NPRM to five.) Requiring States to meet 100 percent of targets is not consistent with the “or made significant progress toward meeting” targets provision in 23 U.S.C. 148(i). Four out of five targets (80 percent) is more than the AASHTO and State DOT supported NPRM proposal to meet 50 percent of targets and similar to the 75 percent recommendation advocated by many commenters.

The AASHTO and Michigan DOT, in comments submitted after the close of the comment period, argued that non-motorized performance measures should not be considered in the

determination of whether a State has met or made significant progress toward meeting targets because including them would limit a State’s ability to use a comprehensive, data-driven approach to determine the best set of safety investments to achieve performance targets and because MAP-21 does not require such measures. As explained earlier, FHWA agrees with many commenters that it is important to hold States accountable to improve non-motorized safety. Including non-motorized performance in the assessment of whether a State met or made significant progress toward meeting targets will ensure that these measures have an impact on how investment decisions are made in this performance area, will improve non-motorized transportation safety, and will provide a publicly available platform to show whether the progress States are making in non-motorized transportation safety. Further, including non-motorized performance targets in FHWA’s assessment of significant progress is consistent with the statutory requirements in 23 U.S.C. 150 and 148(i). The FHWA is establishing the non-motorized measure as part of its mandate in 23 U.S.C. 150(c)(4) to establish measures for States to use to assess the number of serious injuries and fatalities. For measures established by FHWA, including those identified in 23 U.S.C. 150(c)(4), States are required to establish targets reflecting these measures. 23 U.S.C. 150(d). Where States are required to establish targets, those targets are subject to the assessment under 23 U.S.C. 148(i) (requiring a determination of whether a State has “met or made significant progress toward meeting the performance targets of the State established under section 150(d)”). Therefore, FHWA includes the non-motorized performance measure in the assessment of whether a State met or made significant progress toward meeting targets.

Finally, FHWA also considered the fifth option: Whether significant progress should be defined as an outcome that is better than the State’s performance for some year or years prior to when the target was established. This option supports several of FHWA’s evaluation criteria, as it is simple and encourages States to establish aggressive targets, while not subjecting them to

additional requirements if they fail to meet the aggressive target when their performance still improves. It also supports the national goal to reduce traffic fatalities and serious injuries.<sup>23</sup> Although this option does not associate the significant progress determination with the target the State establishes, it does further the national goal and the purpose of the HSIP, encourages aggressive targets, and acknowledges States that have achieved safety improvement. Therefore, FHWA includes this option in this final rule. This final rule allows States that do not meet a target to be considered as having made significant progress toward meeting the target if the outcome for that performance measure is better than the State’s performance for the year prior to the year in which target was established (*i.e.*, baseline safety performance).

For example, Table 2 presents a fictitious State’s historical data, its Calendar Year (CY) 2018 targets, and FHWA’s assessment of those targets. As targets are established for CY 2018 in the HSIP report that is due in August 2017, “baseline safety performance” is the performance data for CY2016. That is, the 5-year rolling average ending in CY2016 for each performance measure. (As the baseline performance year changes with the target year, if the example were for CY 2019 targets, “baseline safety performance” would be the performance data for CY 2017).

In this example, the only target the State met is its non-motorized safety performance target. This target is not evaluated further. The FHWA then assesses whether the State made significant progress for the other four performance measures, meaning whether the actual outcome for 2014–2018 was better than the baseline performance—2012–2016—for the Number of Fatalities, Number of Serious Injuries, Fatality Rate and Serious Injuries Rate performance measures. State performance did not improve for the Fatality Rate measure, but did improve for the other three. Therefore, for this example, FHWA would determine that the State met or made significant progress toward meeting its CY 2018 targets since 4 of the 5 targets were either met or were better than the baseline safety performance.

<sup>22</sup> 23 U.S.C. 148(i).

<sup>23</sup> 23 U.S.C. 150(b)(1).

TABLE 2—EXAMPLE OF THE DATA AND TARGET ASSESSMENT METHODOLOGY  
[For illustrative purposes]

Performance measures	5 Year rolling averages							2018 target	Target achieved?	Better than baseline?	Met or made significant progress?
	2008–2012	2009–2013	2010–2014	2011–2015	2012–2016 baseline performance	2013–2017	2014–2018				
Number of Fatalities .....	501.2	486.6	478.0	476.0	474.0	473.0	472.4	468.0	No .....	Yes .....	Yes.
Fatality Rate .....	1.052	1.018	1.000	0.994	0.988	0.990	0.990	0.980	No .....	No.	
Number of Serious Injuries.	2,740.8	2,613.6	2,517.0	2,447.8	2,310.4	2,219.2	2,185.6	2,160.0	No .....	Yes.	
Serious Injury Rate .....	5.764	5.476	5.272	5.116	4.822	4.644	4.584	4.572	No .....	Yes.	N/A.
Number of Non-motorized Fatalities and Serious Injuries.	126.2	118.0	116.8	115.2	113.2	110.0	109.4	110.0	Yes .....		

This option is similar to the significant progress methodology that FHWA proposed to assess pavement and bridge condition targets where an improvement above baseline is considered significant progress.<sup>24</sup>

In addition to the five options discussed above, FHWA considered three alternative methodologies that were suggested in public comments. These include: (1) Providing additional flexibility for top performing States; (2) allowing a State to submit evidence of extenuating circumstances outside the State DOT's control that contributed to the State not meeting its targets; and (3) assessing significant progress based on performance over a number of years, rather than annually.

The AASHTO suggested FHWA consider allowing certain top performing States to be exempt from the assessment regarding meeting or making significant progress toward meeting a target if a condition was met. Idaho, North Dakota, Michigan, Minnesota, Missouri, Montana, North Dakota, Oregon, Virginia, and Wyoming DOTs specifically stated that the proposed NPRM methodology may not be appropriate for all States, especially those that have already made large gains in reducing fatal and serious injury crashes. To address these comments, FHWA considered exempting a certain number of top performing States or States that had made large gains, a certain percentage of the States that had performed best in the past, or exempting the States that contribute the most toward the national goal (*e.g.* those States that reduce the largest number of fatalities or serious injuries). The FHWA determined that such options would be difficult to implement and would not

meet the evaluation criteria. Excluding some top performing States would not relate the target achievement and significant progress determination to the State's target, since the top performing States would not be assessed at all. In addition, this option would not be simple, understandable, or transparent. Further, this option could place States in competition with each other since only the "top performing" States would benefit from this provision. This option could also be unfair to States with smaller overall numbers of fatalities or serious injuries. The purpose of implementing a transformational national performance management program is to measure performance by and within each State, not to assess performance by States against other States.

The AASHTO and States who supported AASHTO, along with individual comments from Arkansas, Illinois, Louisiana, New York, Pennsylvania, and South Dakota DOTs, and MARC specifically requested FHWA provide flexibility in the evaluation of meeting or making significant progress toward meeting targets for unforeseen circumstances or events outside of the State DOT's control. In addition, the Santa Barbara County Association of Governments (SBCAG) commented that many improvements to highway safety are outside the control of State DOTs and MPOs and depend on factors other than transportation infrastructure. The FHWA recognizes these concerns but emphasizes that State DOTs and MPOs are provided with HSIP funds annually to reduce fatalities and serious injuries on all public roads. The FHWA accounts for unforeseen events and factors outside of a State DOT's control in this rule in several ways. First, the 5-year rolling average provides a smoothing effect for variations in data that account, to a large degree, for such circumstances. Second, States that do

not meet their target are considered as having made significant progress toward meeting the target if performance for that measure is better than performance for the year prior to the year in which the target was established. Third, only requiring a State to meet four out of five targets allows a State not to meet or make significant progress toward meeting an individual target for a performance measure or even be worse than the baseline, yet still result in a determination that the State has met or made significant progress toward meeting its performance targets. Fourth, States are encouraged to include the risk of unforeseen events and circumstances outside their control as part of their considerations as they establish targets. Because unforeseen events and factors outside of State DOT control are already considered as described above, FHWA has decided not to include an option for a State DOT to indicate that unforeseen circumstances should allow it or one of its targets to be exempt from target assessment.

The SBCAG and the Transportation Agency for Monterey County also advocated for HSIP funds to be available for activities beyond HSIP projects, specifically to include projects that address driver behavior. Eligible use of HSIP funds is addressed in the HSIP regulation at 23 CFR part 924. Under 23 U.S.C. 148, an HSIP project is defined as strategies, activities, or projects on a public road that are consistent with a State SHSP and that either corrects or improves a hazardous road segment, location, or feature, or addresses a highway safety problem. Examples of projects are described in 23 U.S.C. 148(a). (See 23 CFR part 924).

The FHWA also evaluated an option that would apply the target achievement and significant progress assessment after a certain number of years, rather than annually. Missouri and Rhode Island State DOTs commented that it would be difficult to adjust their State

<sup>24</sup> Assessing Pavement Conditions and Bridge Conditions for the Second National Highway Performance Program Management Measures; NPRM 80 FR 326 (proposed January 5, 2015) <http://www.gpo.gov/fdsys/pkg/FR-2015-01-05/pdf/2014-30085.pdf>.

Transportation Improvement Program (STIP) annually to implement a different set of safety improvements if they are determined to not have met or made significant progress toward meeting targets annually. They state that more time between assessment periods could improve a State's ability to determine what is working in its STIP and what is not, and to program/implement projects that have more impact to drive down fatality and serious injury numbers and rates. The FHWA did not pursue this approach because safety reporting is already required annually. For example, the HSIP reports submitted by States which include the fatality and serious injury data commensurate with the safety performance measures are transmitted on an annual basis. States establish targets and report on safety performance measures to NHTSA as part of their HSP and Highway Safety Annual Reports. Conducting an annual assessment is also consistent with the requirement to submit an annual implementation plan if the State fails to meet or make significant progress toward meeting its targets. If target achievement and significant progress were evaluated over a longer time period, the assessment would no longer align with the other safety reporting. In addition, waiting longer to assess whether States met or made significant progress toward meeting targets would not necessarily address the concerns about modifying the STIP, since the requirement for States subject to the 23 U.S.C. 148 provisions to obligate funds within the subsequent fiscal year is not based on how much time elapses between target assessments. In its analysis of docket comments and deliberations regarding changes to the methodology for assessing whether a State has met or made significant progress toward meeting its targets, FHWA was mindful of the provisions States must follow if FHWA determines they have not met or made significant progress toward meeting their performance targets. The 23 U.S.C. 148(i) requires States to: (1) Use a portion of their obligation authority only for HSIP projects and (2) submit an annual implementation plan that describes actions the State DOT will take to meet their targets. Both of these provisions apply each year after FHWA determines that the State has not met or made significant progress toward meeting its performance targets.

The Virginia DOT interprets the statute to say that States have 2 years to meet their targets, since FHWA must make a determination whether States have met or made significant progress

toward meeting their targets by the date that is 2 years after the date of the establishment of the performance targets. As a result, Virginia DOT asked how FHWA could apply the provisions of 23 U.S.C. 148(i) if the determination were not made within 2 years of the date the target was established. In MAP-21, the 23 U.S.C. 148(i) stated "If the Secretary determines that a State has not met or made significant progress toward meeting the performance targets of the State established under section 150(d) by the date that is 2 years after the date of the establishment of the performance targets, . . ." However, the FAST Act changed 23 U.S.C. 148(i) to state, "If the Secretary determines that a State has not met or made significant progress toward meeting the safety performance targets of the State established under section 150(d)." Since the FAST Act removed the 2 year reference that Virginia DOT commented on, the statute can no longer be interpreted the way the Virginia DOT suggests. The FHWA believes that its interpretation is consistent with the plain language of the statute. Similar to what was proposed in the NPRM, FHWA establishes the safety performance measures as annual measures for a single performance year. The FHWA will determine whether a State has met or made significant progress toward meeting its targets when the outcome data for that calendar year is available and expects to notify States of its determination within 3 months. As described earlier in the document, FHWA has been able to shorten its evaluation of State targets by 1 year. The proposed and final approach to assessing significant progress, including the timing, is consistent with the revised language under the FAST Act.

## **V. Section-by-Section Discussion of the General Information and Highway Safety Improvement Program Measures**

### **1. Subpart A—General Information**

#### **Section 490.101 General Definitions**

In the NPRM, FHWA proposed several definitions for terms used in this regulation and in subsequent performance management regulations. The FHWA received only one substantive comment on this section: The County of Marin, CA Department of Public Works, supported including the definition for "non-urbanized area" to include rural areas as well as other areas that do not meet the conditions of an urbanized area. To ensure consistency with revised § 490.209(b) specifying a single, collective non-urbanized area target, FHWA revises the definition for "non-urbanized area" to clearly indicate

that a non-urbanized area is a single, collective area comprising all of the areas in the State that are not "urbanized areas" defined under 23 U.S.C. 101(a)(34). The FHWA also removed the reference to 23 CFR 450.104 from the definition for clarity. The statutory definition provides for a State or local adjusted urbanized boundary based on the area designated by the Bureau of the Census, which is what FHWA intended for States to use when establishing the additional urbanized and/or non-urbanized targets, whereas 23 CFR 450.104 only references the Bureau of Census designated area.

#### **Section 490.111 Incorporation by Reference**

The FHWA incorporates by reference the "Model Minimum Uniform Crash Criteria (MMUCC) Guideline, 4th Edition (2012)" for the definition of serious injuries, as described in § 490.207(c). This guide presents a model minimum set of uniform variables or data elements for describing a motor vehicle crash. The Guide is available at: [http://mmucc.us/sites/default/files/MMUCC\\_4th\\_Ed.pdf](http://mmucc.us/sites/default/files/MMUCC_4th_Ed.pdf). In the NPRM, FHWA proposed the use of MMUCC, latest edition as part of § 490.207(c). Because the regulations now refer to a specific edition of MMUCC, rather than the "latest edition," FHWA determined it was appropriate to incorporate by reference the specific edition. The MMUCC, 4th Edition was included on the NPRM docket.

The FHWA also incorporates by reference the "ANSI D16.1–2007, Manual on Classification of Motor Vehicle Traffic Accidents, 7th Edition" for the definition of non-motorized serious injuries, as described in § 490.205. The document is available from the National Safety Council, 1121 Spring Lake Drive, Itasca, Illinois 60143–3201, (<http://www-nrd.nhtsa.dot.gov/Pubs/07D16.pdf>). As discussed above, a non-motorized fatalities and non-motorized serious injuries performance measure has been added for this final rule.

### **2. Subpart B—National Performance Management Measures for the Highway Safety Improvement Program**

#### **Section 490.201 Purpose**

The FHWA includes a statement describing the general purpose of the subpart: To implement certain sections of title 23 U.S.C. that require FHWA to establish measures for State DOTs to use to assess the rate of serious injuries and fatalities and the number of serious injuries and fatalities. The Colorado



DOT suggested that FHWA reverse the order of the measures, thus listing the number of serious injuries and fatalities followed by the rate of each, in order to show first the importance of each person. The FHWA adopts the language, as proposed in the NPRM, stating the rate first followed by the number, in order to reflect the order of the performance measures as listed in MAP-21.

#### Section 490.203 Applicability

As proposed in the NPRM, FHWA specifies that the safety performance measures are applicable to all public roads covered by the HSIP under 23 U.S.C. 130 and 23 U.S.C. 148. The FHWA did not receive any substantive comments regarding this section and adopts the language in the final rule.

#### Section 490.205 Definitions

In the NPRM, FHWA proposed several definitions for terms used in the regulation. The FHWA revises the final rule in several respects, resulting in the elimination of some terms and the addition of new terms. These changes are reflected in the definitions section and described below. In addition, FHWA revises some of the definitions to provide clarity based on docket comments.

The FHWA adopts a definition for “5-year rolling average” because it is used to define the performance measures in this final rule. In the NPRM, FHWA noted that the 5-year rolling average is the average of five individual, consecutive annual points of data for each proposed performance measure (e.g., 5-year rolling average of the annual fatality rate). Using a multiyear average approach does not eliminate years with significant increases or decreases. Instead, it provides a better understanding of the overall fatality and serious injury data over time. The 5-year rolling average also provides a mechanism for accounting for regression to the mean. If a particularly high or low number of fatalities and/or serious injuries occur in 1 year, a return to a level consistent with the average in the previous year may occur. Additionally, FHWA requested stakeholder comment on whether a 3-, 4-, or 5-year rolling average should be required for the HSIP performance measures and also encouraged comment on whether the use of moving averages is appropriate to predict future metrics. The AASHTO and 15 State DOTs, ATSSA, and local agencies including the Association of Monterey Bay Area Governments (AMBAG), ARC, DVRPC, MARC, Metropolitan Transportation Commission (California), SBCAG, and

SRTA explicitly expressed support for the adoption of a 5-year rolling average for the performance measures. Commenters agreed that a 5-year rolling average allows for the smoothing out of statistical anomalies and provides a means to evaluate progress from year to year in a more consistent fashion than one based on single year peaks and valleys. The AASHTO suggested that the 5-year rolling average is consistent with most States’ current approach to evaluating many of their safety efforts and is an effective way to predict future performance over time and help account for fluctuations in annual data. Several agencies within California including the California State Association of Counties, California Highway Patrol, California Walks, and Nevada County, as well as the NYSAMPO expressed concern that the 5-year rolling average may be too long, recommending that a 3-year rolling average be used instead. The NYSAMPO stated that a rolling average is the proper methodology for documenting trends in safety performance, because it smooths out the propensity for random crash events, but suggested that the 5-year period may be too long, since it uses historical data that looks backward when the intent of MAP-21 is to measure the outcomes of current State and MPO investment choices. Washington State DOT expressed a preference for a 7-year rolling average, but agreed that 5 years is an acceptable mid-point, and indicated that the 5-year rolling average is much preferred to a 1-, 3-, or 4-year period, as it better controls for regression to the mean and associated randomness of crash data. The FHWA maintains that a 5-year rolling average provides the appropriate balance between the stability of the data (by averaging multiple years) and providing an accurate trend of the data (by minimizing how far back in time to consider data). Five years is the best compromise for States with a small number of fatalities that may see wide fluctuations in the number of fatalities from year to year and the desire to minimize the use of historical data. The FHWA adopts a definition for “5-year rolling average” as proposed in the NPRM. Example calculations for all of the performance measures are provided in the discussion of § 490.207.

In the NPRM, FHWA solicited comments on whether the approximate 24-month time lag before FHWA assesses whether a State met or made significant progress toward meeting its targets (time period between the end of the calendar year in which the data were collected and the date the data are

available in the Final FARS and HPMS) is an issue and any impacts it may have on a State DOT’s ability to establish targets. Several commenters expressed concern that this time lag would create difficulties in establishing targets and reporting on meeting or making significant progress toward meeting targets. The AASHTO and several State DOTs recommended that States be allowed to use their own State crash databases for the fatality measures, as they would for the serious injury measures, since the fatality data would be available much earlier in the State databases.

The FHWA agrees that the data lag proposed in the NPRM is a concern. However, FHWA believes it is important to preserve the integrity of the national data wherever possible, and therefore does not believe it is appropriate to use State-certified fatality data if national data exist, due to the variability that could be introduced. To address concerns about the data time lag, FHWA revises the final rule regarding the use of FARS data and adds a definition for “Annual Report File (ARF),” modifies the definition for “Fatality Analysis Reporting System (FARS)” and adds a definition for “Final FARS.” The added and changed definitions clarify the data contained in each FARS file—Final FARS and FARS ARF—and that FARS ARF is available approximately 1 year earlier than Final FARS. These changes will allow FHWA to make the determination of whether a State has met or made significant progress toward meeting its targets approximately 1 year earlier than what was proposed in the NPRM. Further discussion regarding the use of these terms is provided in § 490.211.

As discussed above, in this final rule FHWA revises the methodology for determining whether a State has met or made significant progress toward meeting its performance targets to reflect numerous comments suggesting such changes. The FHWA deletes the definitions for “made significant progress,” “historical trend line,” “prediction interval,” and “projection point” proposed in the NPRM, as these are no longer used.

The FHWA adds a non-motorized performance measure to those proposed in the NPRM and adds definitions for the terms “number of non-motorized fatalities” and “number of non-motorized serious injuries” to explicitly define those terms and the associated data sources. Consistent with comments received on this issue, FHWA is broad and inclusive in defining the non-motorized performance measure. The FHWA considers non-motorists,

consistent with 23 U.S.C. 217(j), to be those transportation system users who are not in or on traditional motor vehicles on public roadways. The FHWA intends to include in the non-motorized performance measure people using many non-motorized forms of transportation including: Persons traveling by foot, children in strollers, skateboarders, persons in wheelchairs (both non-motorized and motorized), persons riding bicycles or pedalcycles, etc.

The FHWA recognizes that FARS uses slightly different coding conventions to input person types in its database from that used in State motor vehicle crash databases. Therefore, FHWA includes different non-motorist person-types in its definitions and coding conventions for the number of non-motorized fatalities and the definition of number of non-motorized serious injuries. For non-motorist fatalities, FHWA defines the fatally injured non-motorist person, *i.e.* the “person type,” defined in FARS,<sup>25</sup> to include the person level attribute codes for (5) Pedestrians, (6) Bicyclists, (7) Other Cyclists, and (8) Persons on Personal Conveyances. For non-motorist serious injuries, FHWA defines the seriously injured person type as the codes and definitions for a (2.2.36) pedestrian or (2.2.39) pedalcyclist in the American National Standard (ANSI) D16.1–2007 *Manual on Classification of Motor Vehicle Traffic Accidents*.<sup>26</sup> The FHWA recognizes that not all State crash databases use the ANSI D16.1 standard. Therefore, FHWA includes in the number of non-motorized serious injuries definition that States may use definitions that are equivalent to those in ANSI. Pedestrian and pedalcyclist person types, or an equivalent, are universally used in State motor vehicle crash databases and are consistent with the FARS person types included in the definition of non-motorized fatalities. For those State motor vehicle crash databases where the person type definitions do not conform to the ANSI D16.1 standard, FHWA will provide guidance on which person types should be included in the non-motorized performance measure data report to FHWA. The FHWA revises the definition for “number of serious injuries” to specifically require compliance with the 4th Edition of MMUCC, rather than the latest edition, as proposed in the NPRM. The AASHTO and the Alaska, Arkansas,

Delaware, Iowa, and Maine DOTs expressed concern with MMUCC compliance if there are changes to the definition in subsequent editions of MMUCC. Additional information regarding the change to specifically require the 4th Edition of MMUCC is contained in the discussion of § 490.207.

The FHWA also clarifies the definition for “number of serious injuries” to specify that the crash must involve a motor vehicle traveling on a public road, which is consistent with FARS and State motor vehicle crash databases as discussed previously. Specifically, FARS only includes fatalities where a motor vehicle is involved in the crash. State crash databases may contain serious injury crashes that did not involve a motor vehicle. In order to make the data consistent for the performance measures in this rule, States will only report serious injury crashes that involved a motor vehicle. This clarification is particularly important when considering the non-motorized performance measure. Non-motorized fatalities and non-motorized serious injuries will only be considered in the performance measure if the crash involves a non-motorist and a motor vehicle. As AASHTO and the Michigan DOT noted in comments submitted after the close of the comment period, fatal and serious injury crashes involving only non-motorists (*e.g.*, a bicyclist crashing into a pedestrian) are not included in FARS or many State motor vehicle crash databases. There is not a single national or State-by-State data source that includes these types of non-motorized fatal or serious injury crashes.

Finally, FHWA revises the definition of “serious injury” to reflect that agencies may use injuries classified as “A” on the KABCO scale through use of the conversion tables developed by NHTSA for the first 36 months after the effective date of this rule, and that after 36 months from the effective date of this rule agencies shall use, “suspected serious injury” (A) as defined in the MMUCC, 4th Edition. The AASHTO and Alaska, California, Georgia, Florida, Missouri, Oregon, Pennsylvania, and Washington State DOTs commented that the 18-month time frame to adopt MMUCC proposed in the NPRM was too aggressive and feared that they or other State DOTs would not be able to comply with the requirement. The Oregon and Washington State DOTs commented that while they could meet the 18-month timeframe, other States may have a hard time meeting it. The AASHTO and the States that generally agree with

AASHTO’s comments on this issue suggested that 36 months to adopt MMUCC would give States that have not planned or are early in the process of converting to MMUCC more time to make the change without placing an undue burden on States already facing limited resources. The FHWA adopts these revisions to extend the timeframe States have to comply with the definition in MMUCC, 4th Edition. Together, these requirements will provide for greater consistency in the reporting of serious injuries, allow for better communication of serious injury data at the national level and help provide FHWA the ability to better communicate a national safety performance story.

The FHWA retains definitions for “KABCO,” “number of fatalities,” “rate of fatalities,” and “rate of serious injuries” as proposed in the NPRM. There were no substantive comments regarding these definitions as proposed, therefore FHWA adopts these definitions in the final rule. Finally, FHWA adds a definition for “public road” to clarify that this rule uses the same definition as is used in the HSIP regulation at 23 CFR part 924.

#### Section 490.207 National Performance Management Measures for the Highway Safety Improvement Program

In § 490.207(a), FHWA describes the performance measures required under 23 U.S.C. 150 for the purpose of carrying out the HSIP. Upon consideration of docket comments and FHWA’s belief that it is important to hold States accountable to improve non-motorized safety, FHWA revises the final rule to include a performance measure to assess the number of combined non-motorized fatalities and non-motorized serious injuries in a State. New paragraph (a)(5), number of non-motorized fatalities and non-motorized serious injuries, is in addition to the four measures proposed in the NPRM: (1) Number of fatalities; (2) rate of fatalities; (3) number of serious injuries; and (4) rate of serious injuries.

In § 490.207(b), FHWA adopts a methodology for calculating each performance measure based on a 5-year rolling average. The AASHTO as well as Maine, Michigan, and Pennsylvania DOTs suggested that more clarity was needed and suggested the potential to revise the calculation of 5-year rolling average to better define how it is calculated and the years to be included in the calculation. The FHWA clarifies that the 5-year rolling average covers the 5-year period that ends in the year for which targets are established. For

<sup>25</sup> FARS/NAS GES Coding and Validation Manual <http://www-nrd.nhtsa.dot.gov/CATS/listpublications.aspx?Id=J&ShowBy=DocType>.

<sup>26</sup> ANSI D 16 (2007): <http://www-nrd.nhtsa.dot.gov/Pubs/07D16.pdf>.

example, the measures for target year 2018 would cover the years 2014, 2015, 2016, 2017, and 2018. Further, FHWA reviewed the performance measure calculations and recognized potential ambiguity in identifying changes from one 5-year rolling average to another. To rectify that ambiguity, for those performance measures calculated using annual data expressed as integers (*i.e.*, number of fatalities or serious injuries), FHWA adopts a calculation of a 5-year rolling average that rounds to the tenths place; similarly, for those performance measures calculated using annual data that was initially rounded to the

hundredths place (*i.e.*, fatality rate per 100 million VMT), FHWA adopts a calculation of a 5-year rolling average that rounds to the thousandths place. Applying an additional place value to the numbers that are being used to produce a 5-year rolling average more accurately reveals the change from one 5-year rolling average to another that might be obscured if the 5-year rolling averages were rounded to the same place value, and alleviates some of the confusion about the methodology pointed out in the comments.

The following items describe the calculation for each of the five

performance measures. In paragraph (b)(1), FHWA states that the performance measure for the number of fatalities is the 5-year rolling average of the total number of fatalities for each State and is calculated by adding the number of fatalities for the most recent 5 consecutive calendar years ending in the year for which the targets are established. The FARS ARF is used if Final FARS is not available. The sum of the fatalities is divided by five and then rounded to the tenth decimal place. The following example illustrates this calculation:

Year	2014	2015	2016	2017	2018
Number of Fatalities .....	694	739	593	533	* 514

\* From FARS ARF, if Final FARS is not available.

1. Add the number of fatalities for the most recent 5 consecutive calendar years ending in the year for which the targets are established:

$$694 + 739 + 593 + 533 + 514 = 3073$$

2. Divide by five and round to the nearest tenth decimal place:

$$3073/5 = 614.6$$

The additional place value (the tenths place) in Step 2 reveals change from one 5-year rolling average to another that might be obscured if the 5-year rolling averages were rounded to the same place value. As proposed in the NPRM, FHWA adopts the data reported by the FARS database for each calendar year (FARS ARF if Final FARS is not

available) as the number of fatalities for each State.

In paragraph (b)(2), FHWA adopts the calculation for the rate of fatalities performance measure as the 5-year rolling average of the State's fatality rate per VMT as first calculating the fatality rate per 100 million VMT, rounded to the hundredths decimal place, for each of the most recent 5 consecutive years ending in the year for which the targets are established. The FARS ARF is used if Final FARS is not available. The FHWA also clarifies the different data sources for the VMT used to calculate the rate measures. State VMT data are derived from the HPMS. The MPO VMT is estimated by the MPO. The FHWA

added the provision for MPO VMT estimates since the NPRM did not identify an appropriate source for MPO VMT, as it does not exist in the HPMS. For more information on MPO VMT, see the discussion of § 490.213. The sum of the fatality rates is divided by five and rounded to the thousandth decimal place. The AASHTO asked for clarification whether the same years of data must be used to calculate a rate for any one calendar year. The FHWA clarifies that rates are calculated using the same year of data (*e.g.* CY 2017 rates are calculated using CY 2017 FARS data and CY 2017 VMT data). The following example illustrates this calculation:

Year	2014	2015	2016	2017	2018
Fatality Rate per 100 million VMT .....	0.91	0.89	0.88	0.86	* 0.98

\* Based on FARS ARF, if Final FARS is not available.

1. Add the fatality rate, rounded to the hundredths decimal place, for the most recent 5 consecutive calendar years ending in the year for which the targets are established:

$$0.91 + 0.89 + 0.88 + 0.86 + 0.98 = 4.52$$

2. Divide by 5 and round to the nearest thousandths decimal place:

$$4.52/5 = 0.904$$

The additional place value (the thousandths place) in Step 2 reveals change from one 5-year rolling average to another that might be obscured if the 5-year rolling averages were rounded to the same place value.

In the NPRM, FHWA proposed that the VMT reported in the HPMS be used for the fatality and the serious injury rate measures. The New York Metropolitan Transportation Council

(NYMTC), ARC, AMBAG, NYSAMPO, San Diego Association of Governments (SANDAG), and the Southern California Association of Governments (SCAG) commented that there are gaps in the quality and availability of safety, roadway, and volume data on roads off of the State system, including local and tribal roads. The FHWA acknowledges there are some data gaps, so includes provisions in this and the HSIP rule (23 CFR part 924) to address those gaps.

First, regarding safety data, FARS is a nationwide census providing NHTSA, Congress, and the American public yearly data regarding fatal injuries suffered in motor vehicle traffic crashes.<sup>27</sup> The NHTSA administers

<sup>27</sup> <http://www.nhtsa.gov/FARS>.

FARS and works with States, as well as State and tribal governments, to improve crash reporting on all public roads including: A grant program under 23 U.S.C. 405(c), which supports State efforts to improve crash data systems; the Traffic Records Assessments programs which support peer evaluations and recommendations to improve State traffic records system capabilities; and the Crash Data Improvement Program, which examines the quality of each State's crash data and provides States with specific recommendations to improve the quality, management and use of the data to support safety decisions.

Second, regarding roadway data, the HSIP rule requires States to collect and use a subset of Model Inventory of



Roadway Elements (MIRE) for all public roadways, including local roads. These data elements will improve States' and MPO's ability to estimate expected number of crashes at roadway locations.

Third, regarding volume data, FHWA acknowledges that while the HPMS derives VMT for all public roads within the entire State boundary, it cannot provide VMT estimates for all public roads within a metropolitan planning area because it may not contain volume data on enough local roads within these areas. In the final rule, FHWA identifies the HPMS as the data source for the State VMT and the MPO VMT estimate as the source for MPO VMT. The FHWA added the provision for MPO VMT estimates since the NPRM did not identify an appropriate source for MPO VMT, as it does not exist in the HPMS. For more information on MPO VMT, see the discussion of § 490.213.

In paragraph (b)(3), FHWA adopts a calculation for the number of serious injuries performance measure as the 5-year rolling average of the total number of serious injuries for each State, to be calculated by adding the number of serious injuries for the most recent 5 consecutive calendar years ending in the year for which the targets are established. The sum of the serious injuries is divided by five and then rounded to the tenth decimal place.

In paragraph (b)(4), FHWA adopts the calculation for the rate of serious injuries performance measure as the 5-year rolling average of the State's serious injuries rate per VMT as first calculating the rate of serious injuries per 100 million VMT, rounded to the hundredths decimal place, for each of the most recent 5 consecutive years ending in the year for which the targets are established. The sum of the serious injury rates is divided by five and rounded to the thousandths decimal place. The FHWA also clarifies the different data sources for the VMT used to calculate the rate measures. State VMT data is derived from the HPMS. The MPO VMT is estimated by the MPO. The FHWA will provide technical guidance to support local computation of VMT-based safety performance targets.

The FHWA adds a new paragraph (b)(5) in the final rule to describe the calculation for the non-motorized fatalities and non-motorized serious injury performance measure as the 5-year rolling average of the total number of non-motorized fatalities and the total number of non-motorized serious injuries for each State. It is calculated by adding the number of non-motorized fatalities to the number of non-motorized serious injuries for each year

for the most recent 5 consecutive years ending in the year for which the targets are established (FARS ARF is used if Final FARS is not available), dividing by five and rounding to the tenths decimal place.

As proposed in the NPRM, in § 490.207(c), FHWA requires that by the effective date of this rule, serious injuries shall be coded (A) on the KABCO injury classification scale through the use of the NHTSA serious injuries conversion tables. These serious injury conversion tables were available in the docket for review. Virginia DOT commented that their serious injury definition has changed over the time period of the conversion tables. The NHTSA State Data Systems team has reviewed the comment and notes that some changes were made over the years in Virginia State crash data, but these changes will not affect the serious injury crash counts that the State would report in compliance with this rule. Therefore, no change is needed to the conversion table.

In response to requests for comment on whether some other injury classification and coding system would be more appropriate, Kentucky, Missouri, and Washington State DOTs and the NYSAMPO supported the use of KABCO. Two professors from the University of Michigan commented that usage of the KABCO scale is known to vary from State to State and even locality to locality. As stated in the NPRM, FHWA recognizes that there is some variability in the injury assessments as well as the implementation of the KABCO reporting system across and within States. The FHWA believes that the KABCO injury classification scale, through the use of the NHTSA serious injury conversion tables, is the best option for documenting uniform serious injury coding for all motor vehicle crashes across all States until all States report serious injuries in accordance with MMUCC, 4th Edition. After MMUCC is fully instituted in all States, these variabilities will be resolved and the conversion tables will no longer be required. The ATSSA, Oregon, and Washington State DOTs suggested that some States do not currently include the KABCO scale in their crash reporting, so the type "A" crash type from that scale would not be available in those States. The FHWA addresses this concern by requiring States that are not using KABCO to use the NHTSA serious injury conversion tables to convert crash reporting to type "A" on the KABCO scale.

The National Association of State Emergency Medical Service Officials

indicated that it does not believe that even the most well-intended law enforcement officers can be expected to accurately make medical diagnoses at the scene of a crash and that research has confirmed that use of KABCO for this purpose is very unreliable and inaccurate. As a result, it suggested that FHWA move away from KABCO and accelerate the date for expecting States to determine serious injury by linking medical records. While FHWA understands that it is difficult for law enforcement officers to make medical diagnoses at crash scenes and that there may be some variability in the diagnoses as well as the implementation of the KABCO reporting system across and within States, FHWA believes that the KABCO injury classification scale, through the use of the NHTSA serious injury conversion tables, is an appropriate step toward providing greater consistency in defining serious injuries. The FHWA does not believe there is a way to implement a national medical records linkage system in time for the implementation of this rule.

In the NPRM, FHWA also proposed that within 18 months of the effective date of this rule, serious injuries were to have been determined using the latest edition of MMUCC. The FHWA received comments from AASHTO and eight State DOTs (see discussion above in § 490.205) regarding the 18-month timeframe suggesting that such a timeframe would be difficult to meet. The AASHTO indicated that if a State is not currently using this definition, it will require a lengthy and resource-intensive process to work with law enforcement to change reporting processes, update manuals and training materials, and then train every law enforcement agency that reports crashes within each State. The AASHTO, and 7 of the 8 State DOTs, recommended that States need 36 months to complete this process, while Alaska DOT recommended 48 months. Washington State DOT and Oregon DOT agreed that 18 months is sufficient time for most agencies.

The FHWA understands that some States will need more than 18 months to come into compliance with MMUCC. The FHWA revises the timeframe for coming into compliance to 36 months based on the estimate provided by AASHTO and the majority of States that commented on this provision. Further, FHWA recognizes State DOT concerns that specifying "the latest edition of MMUCC" in the regulation could cause States to be in noncompliance as soon as a new edition of MMUCC is adopted. Therefore, as recommended by AASHTO and State DOTs that

supported AASHTO comments, FHWA specifies the 4th Edition of MMUCC in this final rule. Should subsequent editions of MMUCC change the serious injury definition, FHWA would consider whether changes are required to this regulation.

The Texas DOT commented that whatever definition is used may not correspond with its pre-2009 crash data. As described in the NPRM, FHWA also recognizes that as serious injury data are migrated to the MMUCC definition, variances may occur in the data collected and reported by States. For example, a State may not be currently coding an injury attribute that is included in the MMUCC and this could cause an over-counting or under-counting that would not occur once MMUCC is adopted. States should make necessary adjustments in establishing their targets to accommodate these potential changes.

In the NPRM, FHWA recommended, but did not require, in § 490.207(d) that States prepare themselves, no later than calendar year 2020, for serious injury data to be collected through and reported by a hospital records injury outcome reporting system that links injury outcomes from hospital inpatient and emergency discharge databases to crash reports. In the NPRM, FHWA gave the NHTSA Crash Outcome Data Evaluation System (CODES) as an example of a crash outcome data linkage system. The National Transportation Safety Board (NTSB) and the Northeast Ohio Areawide Coordinating Agency supported this approach. The AASHTO suggested that the use of a system like CODES that links collision and medical records to identify serious crash injury data has both benefits and drawbacks. The AASHTO indicated that the benefits will likely be better data, but the drawback is likely a longer delay in reporting (up to 3 years) and possibly a loss of some data due to records not matching or Health Insurance Privacy and Portability Act limitations. Both AASHTO and NTSB stated that there is no dedicated funding for CODES or a similar system. As a result, AASHTO suggested that the CODES program needs serious work before being rolled out and becoming part of the core requirement. Massachusetts DOT expressed concern that in smaller geographic States, where it is fairly common to cross State lines between place of incident and place of treatment, it would be extremely difficult to reconcile the two datasets. Minnesota DOT suggested that the current lag between medical data and crash reporting is unacceptable for analysis and for developing countermeasures

and as a result, the 2020 timeframe described in the NPRM is not feasible or appropriate. Florida, Louisiana, Maine, Michigan, Missouri, New York, Oklahoma, Texas, and Utah DOTs expressed similar concerns with the problematic nature of medical linkage systems due to lack of funding and associated expenses, privacy laws, and time lag and suggested that FHWA withhold recommending or requiring an implementation date for such linkage systems until such issues could be resolved.

Due to the unresolved issues associated with medical linkage systems and the docket comments suggesting that an implementation timeframe be omitted from the regulation, FHWA removes the recommendation from the rule. The FHWA believes that medical linkage systems are important and encourages States to embrace a framework to perform comprehensive linkage of records related to motor vehicle crashes resulting in serious injuries by collecting and analyzing data in a manner that will not preclude the use of such systems in their State in the future. As mentioned in the NPRM, DOT is an active liaison to the National Cooperative Highway Research Program Project 17–57 Development of a Comprehensive Approach for Serious Traffic Crash Injury Measurement and Reporting Systems.<sup>28</sup> The DOT is awaiting completion of this project. The recommendations could then be effectively implemented in all States. This final rule does not prohibit a State from using a data linkage system like CODES, but requires States to use the MMUCC definition of “suspected serious injury” and the KABCO system, through use of the NHTSA conversion tables, for reporting serious injuries data for purposes of this rule.

#### Section 490.209 Establishment of Performance Targets

As proposed in the NPRM, FHWA adopts § 490.209(a), which requires State DOTs to establish quantifiable targets for each performance measure identified in § 490.207(a). In paragraph (a)(1), FHWA adopts, as proposed in the NPRM, that State DOT targets shall be identical to the targets established by the SHSO for common performance measures reported in the State’s HSP, as required under 23 U.S.C. 402 and NHTSA’s regulations at 23 CFR part 1200. The three common performance measures are: (1) fatality number; (2) fatality rate; and (3) serious injury number.

<sup>28</sup> <http://apps.trb.org/cmsfeed/TRBNetProjectDisplay.asp?ProjectID=3179>.

The California Department of Transportation (Caltrans), Texas, and New York DOTs submitted comments in support of this requirement. Rhode Island and Washington State DOTs supported consistent measures and efforts to coordinate them. However, AASHTO opposed the requirement for identical targets. Thirty-six State DOTs submitted letters indicating overall support for AASHTO’s comments. Delaware, Florida, Idaho, Maine, Missouri, Montana, North Dakota, Oklahoma, South Dakota, and Wyoming State DOTs submitted individual letters opposing this requirement.

The AASHTO stated that the regulation should more clearly vest target establishment authority in States. One of AASHTO’s concerns with establishing identical targets is the resulting effect of the requirement under 23 U.S.C. 402(k)(4) that a State’s HSP be approved by NHTSA. In effect, AASHTO’s argument is that requiring identical targets in paragraph (a)(1) results in HSIP targets needing NHTSA’s approval, notwithstanding 23 U.S.C. 150(d)(1), which provides States with target establishment authority not subject to FHWA approval. Another one of AASHTO’s concerns is that it believes there are fundamental differences between NHTSA and FHWA’s approaches to transportation safety. The AASHTO stated that State DOTs should be able to implement innovative safety projects and establish aggressive performance targets in their HSPs without fear of “MAP–21 penalties that are imposed” when States do not meet or make significant progress toward meeting these targets. The AASHTO stated that State DOTs should have flexibility to establish safety targets “that have performance holding steady, or in some situations declining, and are consistent with the [political and economic] realities present in their state,” not subject to DOT approval.

In MAP–21, Congress ordered FHWA to “promulgate a rulemaking that establishes performance measures and standards.” 23 U.S.C. 150(c)(1). While 23 U.S.C. 150(d) provides that States establish performance targets, FHWA was given the authority to determine the corresponding performance measures. The FHWA understands AASHTO’s concerns but, for the reasons discussed below, believes that it is consistent with FHWA’s statutory mandate to require that performance measures in a State’s HSIP be identical to those in a State’s HSP where common.

While there are fundamental differences between FHWA’s and NHTSA’s approaches to transportation safety, the connection between the HSIP



and HSP has increased in recent years. In MAP–21, Congress required that the performance measures included in an HSP be those developed by NHTSA and the Governor’s Highway Safety Association (GHSA), as described in the report, “Traffic Safety Performance Measures for States and Federal Agencies” (DOT HS 811 025). 23 U.S.C. 402(k)(4). In this report, States are required to establish goals for and report progress on 11 core outcome measures, agreed upon by NHTSA and GHSA, which include: the number of traffic fatalities, the number of serious injuries in traffic crashes, and fatalities per VMT (*i.e.*, fatalities per mile of travel). Similarly, in MAP–21, Congress required that States’ HSIPs include these three performance measures: the number of fatalities, the number of serious injuries, and fatalities per vehicle mile traveled (*i.e.*, fatalities per VMT). 23 U.S.C. 150(c)(4).

Not only did Congress require in MAP–21 the three common performance measures be included in State HSIPs and HSPs, Congress desired that the two programs work together. The MAP–21 amended 23 U.S.C. 402(b)(1)(F)(v) to require that each State coordinate its HSP, data collection, and information systems with the SHSP, as defined in 23 U.S.C. 148(a). The MAP–21 also amended 23 U.S.C. 148(c)(2)(D)(i) to require that as part of a State’s HSIP, each State “advance the capabilities of the State for safety data, collection, analysis, and integration in a manner that complements the State [HSP] . . . .” Moreover, a State’s SHSP is to be developed after consultation with a highway safety representative of the State’s Governor, who is in fact the SHSO. 23 U.S.C. 148(a)(11)(i). The new and existing performance management linkages connecting the HSIP and HSP to the SHSP promote a coordinated relationship for common performance measures, resulting in comprehensive transportation and safety planning. The FHWA’s requirement for identical targets also is consistent with the requirement in NHTSA’s regulations at 23 CFR part 1200<sup>29</sup> to have common

performance measures that are defined identically. See 23 CFR 1200.11(b)(2). If the measures are defined identically, any associated targets should also be identical. Requiring identical targets, therefore, takes advantage of and reinforces the linkages in MAP–21 between the HSIP and HSP and is consistent with NHTSA’s regulations. If States focus and apply Federal funds and requirements under both programs toward the same safety targets and goals, the opportunity to reduce traffic fatalities and serious injuries is maximized.

Notably, this approach is consistent with the national safety goals Congress established for the Federal-aid highway program and NHTSA’s mission: To reduce traffic fatalities and serious injuries (in the case of FHWA) and to reduce traffic accidents and the resulting deaths, injuries, and property damage (in the case of NHTSA) (23 U.S.C. 150(b)(1) and 23 U.S.C. 402(a)). To further these goals, FHWA strongly encourages State DOTs establish targets that represent improved safety performance.

In addition, allowing a State to establish two safety targets for common performance measures would be inefficient and could lead to public confusion, which is not what Congress intended. See 23 U.S.C. 150(a). Public transparency is vital to ensure that an effective performance management framework exists so that the public can encourage and hold accountable State decisionmakers to achieve aggressive safety targets. If there are two distinct and possibly competing safety targets for common performance measures, the public may have difficulty understanding or assessing a State’s overall performance in those safety areas. Separate targets could also be a burden on States by possibly requiring the collecting and reporting of two different sets of data for common performance measures in an HSIP and an HSP.

The FHWA believes States retain the authority and flexibility to establish safety targets for the common performance measures. The FHWA’s adoption of § 490.209(a)(1) will not interfere with State discretion, because FHWA will not control, supplant, or make it more difficult for States to have their targets approved by NHTSA. Through collaborative discussions, both FHWA Division Offices and NHTSA Regional Offices work closely with each State as the State drafts its HSP targets. The FHWA anticipates that this increased coordination among the State behavioral and infrastructure safety offices during the target establishment

process could result in better communication and working relationships in the States and could reduce the burden of collecting and submitting multiple sets of data.<sup>30</sup>

Regardless of the DOT entity receiving the target from the State (NHTSA or FHWA), the data used to establish the performance measures and targets would be the same. The overlap between the HSP and this rule is in a single area—target establishment for three common performance measures—as NHTSA’s review of a State HSP includes target establishment. Under 23 U.S.C. 402(k)(5), disapproval of a State’s plan, with respect to targets, may occur if “. . . the performance targets contained in the plan are not evidence-based or supported by data.” Under NHTSA’s Uniform Procedures for State Highway Safety Grant Programs, the State identifies its highway safety problems, describes its performance measures, defines its performance targets, and develops evidence based countermeasure strategies to address the problems and achieve the targets (23 CFR 1200.11(a)(1)). The State provides “quantifiable annual performance targets” and “justification for each performance target that explains why the target is appropriate and data driven” (23 CFR 1200.11(b)(2)). The NHTSA Regional Offices work closely with States while the HSPs are being developed, and may request additional information from the State to ensure compliance with these requirements. While NHTSA must ensure that performance targets under the HSP are appropriate and data-driven, it does so only through extensive coordination with the State. This collaborative process should ameliorate any concerns that States will be deprived of needed flexibility in establishing targets.

The FHWA adopts paragraph (a)(2) as proposed in the NPRM, which requires that the performance targets established by the State represent the safety performance outcomes anticipated for the calendar year following each HSIP annual report. As discussed in the NPRM, FHWA recognizes that the State DOT would use the most current data available to it when establishing targets required by this rule; that there are differences in the FARS ARF, Final FARS, and HPMS data bases and the State’s most current data; and that there is a time lag between the availability of FARS and HPMS data and the date by which the State needs to establish performance targets. For the serious

<sup>29</sup> In the IFR NHTSA published, titled “Uniform Procedures for State Highway Safety Grant Programs,” on January 23, 2013. 78 FR 4986 (Jan. 23, 2013), NHTSA stated that due to the linkages between NHTSA-administered programs and other U.S. DOT programs under MAP–21, “[t]he Department will harmonize performance measures that are common across programs of [U.S. DOT] agencies (*e.g.*, fatalities and serious injuries) to ensure that the highway safety community is provided uniform measures of progress. . . . NHTSA intends to collaborate with other [U.S.] DOT agencies to ensure there are not multiple measures and targets for the performance measures common across the various Federal safety programs.” 78 FR 4986–87.

<sup>30</sup> Part of NHTSA’s HSP evaluation process includes ensuring that SHSO-submitted targets are coordinated with the State DOT.



injuries number measure, this lag is not an issue because the serious injury measures and reported outcomes are based on data contained in the State's motor vehicle crash database. The NPRM solicited comments specific to the time lag for the fatality measures, any impacts the time lag may have on a State DOT's ability to establish its targets, and any suggestions that could help address the time lag. The AASHTO expressed support for the use of the FARS database but noted concern with the timely availability of FARS data. Caltrans, Connecticut, Florida, Missouri, Oregon, and Rhode Island DOTs, as well as the DVRPC, New York Metropolitan Transportation Council (NYMTC), Santa Cruz County Regional Transportation Commission, SRTA, Southeast Michigan Council of Governments (SEMCOG), and the Tri-State Transportation Campaign (New York, New Jersey, Connecticut) also raised this concern. Many of these agencies indicated that without an improvement in the time lag it would be difficult for States and MPOs to develop reasonable targets. The AASHTO and several States who supported AASHTO suggested that to reduce the time lag, States should be allowed to self-certify their fatality and serious injury data. The FHWA believes that it is important to preserve the integrity of the national data wherever possible. Therefore, FHWA does not believe it is appropriate to allow States to use State-certified fatality data, because such an approach would introduce variability.

The SEMCOG and Pennsylvania DOT also expressed concern that a 3-year time lag between a given fiscal year and when the FARS and HPMS data are available for assessment of performance from that fiscal year, might result in the State being penalized in the future for something that may have already been corrected, even with the 5-year rolling average. They also suggested that the time lag may be such that projects may already have been implemented that correct the safety issue before the evaluation of significant progress. Finally, there is a perception by some State and local agencies, such as Caltrans and NYSAMPO, that because the data being assessed reflect past performance, the regulation does not meet the intent of MAP-21. Of the comments submitted, only Washington State DOT indicated that the lag time between establishing a target and reporting would not specifically be a problem.

The FHWA agrees that the time lag is an issue and has added the use of FARS ARF if Final FARS is not available to significantly reduce the time lag to

assess whether States have met or made significant progress toward meeting their targets. Regardless, any performance management program relies on an evaluation step that must "look back" after programs and policies are applied and an outcome has occurred. Given the cyclical nature of a performance management framework (establish targets, implement policies and programs, document performance), target evaluation will always occur during or after the time States establish the next target. Each new opportunity to document and evaluate performance will allow States, MPOs, and FHWA to understand the impact of different policies, programs, and strategies on achieving targets and on attaining the national goal. This improved understanding can be applied in future performance management cycles. In this rule, FHWA has reduced the time lag by 1 year from what was proposed in the NPRM, so lessons from past performance can be applied sooner. This change is discussed further in § 490.211(a).

Paragraph (a)(3) requires that State DOTs establish targets that represent the anticipated performance outcome for all public roadways within the State regardless of ownership or functional classification. Rhode Island and Washington State expressed that there may be differences between the requirements to report fatalities on "all public roads" and the data available in FARS. For example, drive aisles and circulating roads in parking lots are included in FARS data. The FHWA acknowledges that FARS may include a very limited number of fatal crashes that do not occur on "public roads" as defined in the HSIP,<sup>31</sup> since FARS includes all crashes occurring on "trafficways,"<sup>32</sup> which does include drive aisles and circulating roads. The slight differences between the two terms could result in FARS including a fatal crash that did not occur on a "public road" as defined in the HSIP. In the definitions section (§ 490.205), FHWA modified the definition of FARS to account for this difference. The NHTSA believes such occurrences are extremely small. However, NHTSA has never quantified the number of such occurrences, since information on whether the trafficway meets the HSIP definition of "public road" is not collected in FARS. Nonetheless, since FARS is the recognized standard as a nationwide census of fatal injuries suffered in motor vehicle traffic crashes

and is already used by the States for reporting fatalities, FHWA retains FARS as the data source for assessing whether a State has met or made significant progress toward meeting its fatality and fatality rate performance targets and the non-motorized fatality number portion of the non-motorized fatality and non-motorized serious injury performance target. States should be aware that FHWA will use FARS as the data source for these assessments and factor that knowledge, including the potential including of a fatal crash that does not occur on a "public road," into their process for establishing targets.

Virginia DOT recommended that the definition of "public roadways" be further clarified in this rulemaking, FHWA guidance, and in the MIRE. Virginia DOT suggested that by requiring performance targets to represent performance outcomes for all "public roadways within the State," the proposed regulation would seem to require reporting and including fatality and serious injury data from and performance of Federal lands roadways, which may not be available to all State agencies. The FHWA confirms that "all public roads" includes Federal lands roadways within the State, per 23 CFR part 924. Virginia DOT also indicated that it is unclear as to whether the definition of "public road" includes public alleys and other service type laneways, typical in cities, and that inclusion of roadway inventory, traffic volumes and crashes for all public alleys would place additional compliance burdens on States. The FHWA confirms that the definition of a "public road" in 23 CFR part 924 includes crashes occurring on these facilities and that because States already collect crash data on these facilities, no additional burden will be realized in carrying out this requirement. The MAP-21 legislation requires that the safety performance targets apply to all public roads, since 23 U.S.C. 150(c)(4) requires performance measures for the purpose of carrying out the HSIP and the purpose of the HSIP is to "achieve a significant reduction in traffic fatalities and serious injuries on all public roads, including non-State owned public roads and roads on tribal land" (See 23 U.S.C. 148(b)(2)). In addition, 23 U.S.C. 150(b)(1) established the national safety goal "to achieve a significant reduction in traffic fatalities and serious injuries on all public roads." In addition to this final rule, FHWA is issuing a final rule for the HSIP (23 CFR part 924) that requires all public roads to be included in the HSIP. The types and ownership of roads

<sup>31</sup> 23 CFR 924.3.

<sup>32</sup> 2013 FARS/NAAS GES Coding and Validation Manual, December 2014.

included in the term “public road” are defined in that rule. To clarify that this rule uses the same definition, FHWA adds to this rule in § 490.205 the definition of public road as it is defined in 23 CFR part 924.

The ARC, AMBAG, and the NYSAMPO suggested that the quality, accuracy, and availability of serious injury data for roadways owned and maintained by local agencies present several challenges in the measurement and target establishment process. As discussed in the NPRM, FHWA recognizes that there is a limit to the quality, accuracy, and availability of some data, as well as to the direct impact the State DOT can have on the safety outcomes on all public roadways. State DOTs and MPOs need to consider this uncertainty in the establishment of their targets.

As proposed in the NPRM, paragraph (a)(4) requires that targets established by the State DOTs begin to be reported in the first HSIP annual report that is due after 1 year from the effective date of this final rule and in each subsequent HSIP annual report thereafter. The AASHTO and the Arizona, Missouri, and Tennessee DOTs, as well as NYSAMPO were in general agreement with the reporting requirements. The FHWA adopts this language in the final rule.

The FHWA revises paragraph (a)(5) from the proposal in the NPRM to require that for the purpose of evaluating the serious injury and non-motorized serious injury targets States are to report at a minimum the most recent 5 years of serious injury and non-motorized serious injury data, as compared to the 10 years proposed in the NPRM, in their annual HSIP report (See 23 CFR part 924). The FHWA reduces the number of years of data required to reflect comments from State DOTs, such as Texas DOT, which reported that the State does not archive data back as far as the 10 years proposed in the NPRM, as well as a comment from ATSSA that many States have not archived their data for the last 10 years and that a 5-year archive is common for many States. In addition, 5 years of data will be sufficient for FHWA to assess whether States met or made significant progress toward meeting targets using the new methodology in that portion of the regulation. As part of this change, FHWA removes proposed paragraph (a)(5)(i) regarding the years required for the 10 years of data. However, FHWA encourages States to report as many years of additional crash data as they find appropriate for carrying out the HSIP. The FHWA adds the requirement for non-motorized serious injuries to

correspond to the added performance target for non-motorized fatalities and serious injuries. The FHWA includes in paragraph (a)(5) (paragraph (a)(5)(ii) in the NPRM) the requirement that serious injury data be either MMUCC compliant or converted to KABCO system (A) to provide consistency throughout the regulation.

In response to comments from AASHTO, FHWA revises paragraph (a)(6) to clarify that, unless approved by FHWA, a State DOT shall not change one or more of its targets for a given year once it has submitted its target in the HSIP annual report. The AASHTO indicated that the regulation needs to clearly state that a State does not need FHWA approval to change its target in a subsequent year and that the restriction precluding a State from modifying its HSIP targets “unless approved by FHWA” once the target is submitted in the State’s HSIP annual report applies only for a given year. The FHWA agrees with AASHTO that an important part of a performance management approach is to periodically evaluate targets and adjust them to reflect risks, revenue expectations, and strategic priorities. Since this rule requires States to establish safety performance targets each year, FHWA does not believe any changes are necessary to the regulation to allow States to change targets in subsequent years. If a State submits a target for CY 2017 in its 2016 HSIP report, it cannot change that CY 2017 target without approval from FHWA and from NHTSA for the common performance measures in the HSP because these targets are identical. The State will establish a new target for CY 2018 in its 2017 HSIP report.

The FHWA revises § 490.209(b) to clarify that in addition to targets described in § 490.209(a) (statewide targets), State DOTs may establish additional targets for portions of the State to give the State flexibility when establishing targets and to aid the State in accounting for differences in urbanized and non-urbanized areas consistent with 23 U.S.C. 150(d)(2). Nevada County, CA suggested that while additional measures may be appropriate, depending on the unique circumstance in a jurisdiction, all areas should be required to monitor the same four basic measures. It was FHWA’s intention in the NPRM to require State DOTs to establish targets for each of the performance measures proposed, yet allow States to choose to also establish different performance targets for urbanized and non-urbanized areas. The revised language in this final rule is meant to clarify that intent. The FHWA

believes that this approach appropriately implements 23 U.S.C. 150(d)(2), providing that States may choose to establish different performance targets for urbanized and non-urbanized areas. The MARC and the Rails-to-Trails Conservancy supported the concept of separating urbanized and non-urbanized areas for the purpose of performance measures, whereas the Tennessee DOT did not believe it is appropriate to create separate performance measures. Texas DOT requested clarification on how population growth would be accommodated. The SEMCOG requested clarification about how a change in the functional classification could affect the performance measure outcomes. As discussed in the NPRM, the U.S. Census Bureau defines urbanized area boundaries based on population after each decennial census. After the U.S. Census Bureau designates urbanized area boundaries, each State may adjust those Census-defined urbanized areas. While FHWA requests that States complete the process to adjust urbanized area boundaries within 2 years after the Census-defined boundaries are published, urbanized area boundaries could change on varying schedules. Designation of new urbanized areas or changes to the boundary of existing urbanized areas may lead to changes in the functional classification of the roads within those areas. Therefore, changes to the urbanized area boundaries affect the scope of the urbanized and non-urbanized targets.

Each performance measure in this rule is based on calendar year data. Section 490.209(b)(1) requires States, if they choose to establish additional targets, to identify the urbanized areas and non-urbanized area boundaries for each calendar year used for these targets. States must declare and describe these boundaries in the State HSIP annual report required by 23 CFR part 924. States should consider the risk for urbanized area boundary changes when establishing any urbanized area or non-urbanized areas target.

For example, the U.S. Census Bureau is expected to release new urbanized area boundaries in 2022, as a result of the 2020 census. A State may opt to establish an urbanized area fatality number target for the 5-year rolling average ending in 2023 in its HSIP report due August 2022. The State must establish its 2023 target using the number of fatalities in the urbanized area as that urbanized area was defined for each year in the 5-year rolling average. So, in the 5-year rolling average ending in CY 2023, the urbanized area



boundary for years 2019, 2020, and 2021 is the one based on, or adjusted from, the 2010 census. For years 2022 and 2023, the urbanized area boundary is the one based on, or adjusted from, the 2020 census. The FHWA intends to issue additional guidance regarding the voluntary establishment of performance targets for urbanized and non-urbanized areas.

The FHWA adds four paragraphs to the final rule to provide States that decide to establish these targets with more specific information regarding requirements for these additional targets. Generally, a State DOT could establish additional targets for any number and combination of urbanized areas and could establish a target for the non-urbanized area for any or all of the measures described in paragraph (a). Paragraph (b)(1) requires States to declare and describe the boundaries used to establish each additional target in the State HSIP annual report (23 CFR part 924).

Paragraph (b)(2) indicates that States may select any number and combination of urbanized area boundaries and may also select a single non-urbanized area boundary for the establishment of additional targets. This provision is different from that proposed in the NPRM, which allowed only one aggregated urbanized area target for all urbanized areas in the State. The NPRM limited States to one urbanized target for all urbanized areas in the State so that a State could not establish an unmanageable number of urbanized area targets, nor could it use success in meeting those targets to overall make significant progress even if the State did not meet its statewide safety targets. Smart Growth America and Transportation for America suggested that the additional, optional targets for portions of the State to account for urbanized and non-urbanized areas be treated differently from the statewide targets. Similarly, AASHTO, Iowa, Maine, Missouri, New York, Vermont, and Washington State DOTs preferred that only the statewide targets be included in the significant progress assessment.

The FHWA agrees and is not including assessment of the optional targets in determining whether the State met or made significant progress toward meeting its targets, as was proposed in the NPRM. Removing the optional targets from the significant progress assessment results in greater nationwide consistency in both the process of conducting the assessment and the transparency of the results. Because the optional targets are now not included in assessing whether the State met or made

significant progress toward meeting its targets, FHWA is able to provide States the flexibility to establish separate targets for each urbanized area, as States determine appropriate. The FHWA also believes that this approach may encourage States to establish these additional targets. For States that want to establish a non-urbanized target, they are still restricted to a single non-urbanized target because there is no national standard for sub-dividing non-urbanized areas in a State. Establishing these additional targets could provide for additional transparency and accountability in a State's performance management program, and they could aid the State in accounting for differences in performance in urbanized areas and the non-urbanized area.

In paragraph (b)(3), FHWA requires that boundaries used by the State DOT for additional targets be contained within the geographic boundary of the State. Finally, in paragraph (b)(4), FHWA requires that State DOTs separately evaluate the progress of each additional target and report progress for each in the State HSIP annual report (23 CFR part 924). This provision would meet the requirements of 23 U.S.C. 150(e)(3).

As proposed in the NPRM, FHWA establishes in § 490.209(c) that MPOs shall establish their performance targets for each of the measures established in § 490.207(a), where applicable, in a manner that is consistent with elements defined in paragraphs (c)(1) through (5). Paragraph (c)(1) requires that MPOs establish their targets not later than 180 days after the State submits its annual HSIP report in which the State's annual targets are established and reported. Washington State DOT, the AMPO, and the Puget Sound MPO supported the 180-day timeframe for MPOs to establish targets either through supporting the State target or by establishing targets unique to a metropolitan area. Caltrans did not support the 180-day timeframe because their experience shows that MPOs and Tribal governments will need resources, data expertise, and substantial coordination to establish targets, which cannot be accomplished within 180 days. The SCAG indicated that it is reasonable to require States to report annual targets, because State DOTs are already responsible for issuing the HSIP on an annual basis, yet most MPOs do not administer safety improvement plans on an annual basis, nor do they receive funding to do so. The statute (23 U.S.C. 134(h)(2)(C)) requires MPOs to establish targets not later than 180 days of State DOTs establishing their targets.

Therefore, FHWA retains that requirement in this final rule.

In the NPRM, FHWA requested stakeholder comment on alternative approaches to the required coordination with the long range metropolitan and statewide and nonmetropolitan transportation planning processes. The SCAG recommended that the MPO reporting requirements be aligned with the respective metropolitan transportation planning cycle of each MPO, which SCAG stated is consistent with the "Statewide and Nonmetropolitan Transportation Planning; Metropolitan Transportation Planning" NPRM released by FHWA and FTA on June 2, 2014 (FHWA-2013-0037).<sup>33</sup> That NPRM for 23 CFR part 450 proposed that MPOs reflect performance targets required by MAP-21 in their metropolitan transportation plans. The NYSAMPO also suggested that establishing targets annually does not fit in with the time horizon of long range plans and that the time frame for target reporting in this rule is far more frequent than currently required on anything similar. They also questioned why MPOs should establish their targets if they are not held accountable and indicated this requirement may force the MPOs to choose to support the State target each year (due to time and resource limitations) and align project and program funds to State supported initiatives at the expense of the regional/local context at each MPO. The MARC expressed similar concern that annual target establishment would be overly burdensome and inconsistent with long-range planning. Washington State DOT commented that there should be an emphasis on MPO participation in development of the SHSP.

The FHWA emphasizes that targets established under this final rule should be considered as interim condition/ performance levels that lead toward the accomplishment of longer-term performance expectations in the State DOT's and MPO's long-range transportation plan. Furthermore, under 23 U.S.C. 148(a)(11)(A)(ii), States are required to consult with MPOs in the development of the State SHSP, and both should recognize that the annual targets should logically support, as interim levels of performance, the safety goals in that plan. Finally, 23 U.S.C. 134(h)(2)(D) and 135(d)(2)(C) require States and MPOs to integrate into the transportation planning process the goals, objectives, performance measures

<sup>33</sup> The Statewide and Nonmetropolitan Transportation Planning; Metropolitan Transportation Planning NPRM: <http://www.regulations.gov/#!documentDetail;D=FHWA-2013-0037-0001>.



and targets described in other State transportation plans and processes required as part of a performance based program. In addition, the Planning NPRM proposed to require States to consider the performance measures and its performance targets when developing its planning documents and making investment priorities. State DOTs and MPOs will be expected to use the information and data generated as a result of this new regulation to better inform their transportation planning and programming decisionmaking. In particular, FHWA expects that these new performance requirements will help State DOTs and MPOs make better decisions on how to use their resources in ways that will result in the greatest possible reduction in fatalities and serious injuries, as well as to achieve their other performance targets. The FHWA acknowledges that we received several comments related to the planning process. For additional information on how the new performance management requirements fit into the statewide and metropolitan planning process, please review the Planning NPRM.<sup>34</sup>

The FHWA adds paragraph (c)(2) to clarify that the MPO targets are established annually for the same calendar year period that the State targets are established. In paragraph (c)(3), FHWA clarifies the language in this final rule from what was proposed in paragraph (c)(2) in the NPRM to indicate that after the MPOs within the State establish the targets, FHWA expects that upon request, the State DOT can provide the MPOs targets to FHWA.

The AMPO and individual MPOs, including ARC, Hampton Roads Transportation Planning Organization, Puget Sound and Tennessee MPOs, as well as Iowa, Michigan, Tennessee, and Vermont State DOTs submitted comments regarding paragraph (c)(4) (paragraph (c)(3) in the NPRM). The AMPO expressed concern that the expectation of this requirement, as written in the NPRM, was that MPOs would program the very limited, regionally allocated, Surface Transportation Program (STP)<sup>35</sup> funds toward additional specific projects in support of the State's targets. The AMPO suggested that MPOs be allowed

to establish a numerical target for individual performance measures and support the State target on remaining targets. Recognizing the often limited STP funds allocated to MPOs and the desire of some MPOs to have flexibility to establish their own targets, FHWA modifies paragraph (c)(4) to indicate that MPO targets shall be addressed by either (i) agreeing to plan and program projects so that they contribute toward the accomplishment of the State DOT safety targets or (ii) committing to quantifiable targets for the metropolitan planning area. To provide MPOs with flexibility and to be respectful of the potential burden of establishing individual targets, FHWA allows MPOs to support all the State targets, establish specific numeric targets for all of the performance measures, or establish specific numeric targets for one or more individual performance measures and support the State target on other performance measures.

Caltrans and Washington State DOTs indicated that some MPOs do not have the capability or the finances to collect volume data; therefore it is difficult for them to have appropriate data for all public roads. To address this comment, in this final rule, FHWA adds paragraph (c)(5) that requires MPOs that establish targets for rates (fatality rate or serious injury rate) to report the VMT estimate used for such targets and the methodology used to develop the estimate. The methodology should be consistent with that used to satisfy other Federal reporting requirements, if applicable. In the NPRM, FHWA proposed that MPO VMT be derived from the HPMS. However, the HPMS does not provide sufficient information to derive complete VMT in an MPO planning area, since local roadway travel is only reported to HPMS in aggregate for the State and for Census urbanized areas. Therefore, consistent with the overall goals of performance management identified in 23 U.S.C. 150(a) to increase transparency and accountability, FHWA requires MPOs that establish rate targets to report the methodology used to estimate the MPO VMT. Many MPOs collect VMT data within their planning area and estimate VMT for the transportation planning process or for transportation conformity required under the Clean Air Act. The MPO VMT estimate used for rate targets for this rule should be consistent with these or other Federal reporting requirements, if applicable. Consistency with other Federal reporting requirements and existing MPO efforts will minimize the burden on MPOs that choose to establish rate targets and

increase the transparency of the MPO target establishment process. The FHWA will provide technical assistance to those MPOs that estimate their VMT and will review MPO VMT estimates as part of the MPO target achievement review process established in 23 CFR part 450.

As proposed in the NPRM, FHWA adopts paragraph (c)(6) that requires MPO targets established under paragraph (c)(4) to represent all public roadways within the metropolitan planning area boundary regardless of ownership or functional classification. Washington State DOT requested additional clarification in the language to clarify that the intention is not to have different targets based on functional class. The Washington State DOT further explained that most MPOs are interested in having the targets applied to all public roads within the MPO boundary regardless of functional class and that it does not support different targets for different functional classes of roadways. The FHWA agrees. An MPO is not expected to establish separate targets for each functional classification. It is required to support the State's target or establish its own targets only for the five performance measures for which the State is required to establish targets under § 490.209(a). The MPO targets must include all public roads within the planning area, regardless of their functional classification. The FHWA retains the language, as proposed, in the final rule.

In paragraph (d), FHWA requires State DOTs and MPOs to coordinate on the establishment of the State targets or the MPO's decision to either agree to plan or program projects so that they contribute toward meeting the State targets or commit to their own quantifiable targets. The Washington State DOT suggested that the NPRM was unclear as to whether it would be appropriate for either the State target or the MPO target to have different boundaries and noted that the NPRM did not require coordination and agreement on target establishment. The FHWA believes it is appropriate for the State target and the MPO target to have different boundaries, since the metropolitan planning area does not necessarily coincide with State lines or urbanized area boundaries.

As proposed in the NPRM, and consistent with 23 U.S.C. 134(h)(2)(B)(i)(II) and 23 U.S.C. 135(d)(2)(B)(i)(II), FHWA requires coordination between the State DOT and relevant MPOs on target establishment in this rule in paragraph (d)(1) to ensure consistency, to the maximum extent practicable, but this

<sup>34</sup> The Statewide and Nonmetropolitan Transportation Planning; Metropolitan Transportation Planning NPRM: <http://www.regulations.gov/#/documentDetail;D=FWHA-2013-0037-0001>.

<sup>35</sup> Section 1109 of the FAST Act (Pub. L. 114-94) converts the Surface Transportation Program found at 23 U.S.C. 133 into the Surface Transportation Block Grant Program.

rule does not require the MPO and State to reach a consensus agreement on their targets. The FHWA expects that States and MPOs will establish a process by which they will meet the coordination requirements in this rule. States and MPOs are expected to follow their established processes, as part of the ongoing coordination that occurs during the statewide and metropolitan transportation planning processes. The Planning NPRM<sup>36</sup> proposed requiring coordination, to the maximum extent practicable, among MPOs and State DOTs on their target setting efforts. The FHWA asked a series of questions in the Planning NPRM related to coordination among MPOs and State DOTs relating to target setting. As a result, FHWA expects to provide information in the preamble to the Planning Final Rule that will further describe how MPOs and States DOTs could coordinate on target setting efforts. Further, FHWA is conducting research and developing guidance documents and training courses to implement the new performance management requirements. In these materials, FHWA will emphasize the importance of MPO and State DOT coordination during target setting; provide examples of noteworthy target setting coordination efforts, and reference tools that States and MPOs can use to improve coordination.

In the NPRM, FHWA specified that “relevant” MPOs coordinate with the State because that is the requirement in 23 U.S.C. 135(d)(2)(B)(i)(II). Michigan and Washington State DOTs, Puget Sound MPO, NYSAMPO, and AMPO all requested clarification of the word “relevant.” For the measures in this rule, relevant MPOs are any MPO where all or any portion of the MPO planning area boundary is within the State boundary. The AMPO also expressed concern for potential issues with how multi-State MPOs establish targets, coordinate and report them. Tennessee DOT also questioned how MPOs should coordinate one target for the urbanized area while addressing performance targets for two or more State DOTs. The FHWA adds paragraph (d)(2) to address situations where metropolitan planning areas extend across multiple States. This addition clarifies that MPOs with multi-State boundaries that agree to plan or program projects so that they contribute toward State targets are to plan and program safety projects in support of the State DOT targets for each State that their metropolitan planning area covers. For example, MPOs that extend into two States are to contribute toward two separate sets of targets—one for each

State. Through coordination with the State (or States for multi-State MPOs), MPOs that elect to establish quantifiable targets for their metropolitan planning area should consider each State’s target and ensure consistency, to the maximum extent practicable, when establishing the MPO targets. An MPO with a planning area that crosses into two States may choose to agree to plan and program projects so that they contribute toward the State target for one State and establish a quantifiable target for the planning area in the other State.

#### Section 490.211 Determining Whether a State Department of Transportation Has Met or Made Significant Progress Toward Meeting Performance Targets

The FHWA changes the title and language within this section to provide consistency with legislative language regarding determining whether a State has met or made significant progress toward meeting its targets. Specifically, FHWA revises the terminology to reflect “met or made significant progress toward meeting performance targets” rather than “achieving” targets. The FHWA also adds paragraph numbering to improve readability of this section.

As proposed in the NPRM, in paragraph (a), FHWA lists the data sources that will be used in the determination whether a State has met or made significant progress toward meeting its targets. Based on a review of the comments related to data lag and FHWA’s own desire to decrease the lag, FHWA revises § 490.211(a) to reflect that meeting or making significant progress toward meeting targets will be determined based on the most recent available Final and FARS ARF data for the fatality number, fatality rate, and for the non-motorized fatality number. Final FARS will be used for all years for which it is available when FHWA makes an assessment of whether a State has met or made significant progress toward meeting its targets. If Final FARS is not available—usually the last year of the 5-year rolling average for the target being assessed—FARS ARF will be used. The FARS ARF is published approximately 1 year before the Final FARS report, and as a result, using FARS ARF data reduces the data time lag by approximately 1 year. The FHWA believes that improvements in data systems will also enable the HPMS data to be available in this timeframe. As a result, FHWA is confident that Final FARS, FARS ARF, and HPMS data can be available within 12 months of the end of the calendar year for which the targets are being assessed. The FHWA believes this change addresses the

concern over the time lag for assessing whether a State has met or made significant progress toward meeting its targets to the maximum extent possible.

As an example to illustrate the time between establishment of State targets and national and State data source availability to assess whether the State met or made significant progress toward meeting its targets, targets that represent anticipated safety performance measures outcomes for CY 2018 would need to be established by the State DOT and reported in its HSIP annual report due August 31, 2017. For the purposes of establishing targets, States are encouraged to use any and all data available, including data that go beyond traditional datasets, such as FARS, HPMS, and State crash databases to include current and pending legislation, political factors, available resources, etc. The FHWA will assess the targets established by the State for CY 2018 when the CY 2018 FARS and HPMS data become available in approximately December of 2019, 1 year earlier than proposed in the NPRM. The FARS ARF will be used for CY 2018 fatality data if Final FARS is not available. Final FARS data for CY 2014 to CY 2017 is expected to be available, as is CY 2014 to CY 2018 HPMS data. The State serious injury number and rate data used to evaluate the CY 2018 targets will be reported in the HSIP report due August 31, 2019. The FHWA will assess whether States met or made significant progress toward meeting their CY 2018 targets and report findings to the States by March 31, 2020.

Paragraphs (a)(3) and (6) are added to indicate that FHWA will use the most recent available Final and FARS ARF data for the non-motorized fatality number and State reported data for the non-motorized serious injuries number, to evaluate the non-motorized performance target that FHWA adds in this final rule. To also address the non-motorized performance target, FHWA adds in paragraph (b) that non-motorized serious injury data will be taken from the HSIP report.

Paragraph (c) of the final rule (paragraph (b) of the NPRM) describes the process by which FHWA will evaluate whether a State DOT has met or made significant progress toward meeting performance targets. As discussed earlier in the *Met or Made Significant Progress Toward Meeting Targets Evaluation* section, FHWA adopts a revised methodology from what was proposed in the NPRM to address a wide variety of comments. In paragraph (c)(1), FHWA indicates that optional additional targets (urbanized and non-urbanized targets) established

<sup>36</sup> [www.regulations.gov](http://www.regulations.gov) (FHWA–2013–0037).



under § 490.209(b) will not be evaluated for whether the State met or made significant progress toward meeting its targets. The FHWA believes that excluding these additional targets from the significant progress assessment provides an opportunity for some flexibility with respect to these targets and may encourage State DOTs to establish these additional targets. In paragraph (c)(2) FHWA indicates that a State DOT is determined to have met or made significant progress toward meeting its targets when at least four of the five performance targets are met or the outcome for the performance measure is better than the 5-year rolling average data for the performance measure for the year prior to the establishment of the State's target (*i.e.*, baseline safety performance), as described previously in the example for Table 2.

In paragraph (d) of the final rule (paragraph (c) of the NPRM), FHWA adopts the NPRM language with a clarification to specify that if it determines that a State has not met or made significant progress toward meeting its safety targets, the State would need to comply with 23 U.S.C. 148(i) for the subsequent fiscal year. Missouri and Rhode Island DOTs objected to this "penalty," because their STIP will already have been fully committed by the time the significant progress evaluation occurs and the State is notified that the provisions of 23 U.S.C. 148(i) apply. The FHWA recognizes that the STIP is a commitment to the public regarding the projects and activities the State will implement. The FHWA also considers the targets the State establishes as a commitment to the public regarding the performance that will be achieved from those projects and activities and expects that State DOTs already maximize the efficacy of the STIP to reduce fatalities and serious injuries for all road users. The FHWA considers it reasonable to expect States to reconsider and make any necessary changes to how funds will be spent if the State fails its commitment to meet or make significant progress toward meeting its targets. The implementation plan and funding obligation requirements would further optimize safety projects in the STIP so that the State will meet or make significant progress in a following year. The FHWA added language to paragraph (d) to clarify that the 23 U.S.C. 148(i) provisions apply for the subsequent fiscal year after FHWA determines a State has not met or made significant progress toward meeting its targets. States will have several months

after they are informed that the 23 U.S.C. 148(i) provisions will apply to make any necessary adjustments to the STIP to accommodate the HSIP funding requirements and to prepare and carry out their implementation plan.

As explained in the NPRM, the performance provisions in 23 U.S.C. 148(i) require that a State DOT that has not met or made significant progress toward meeting safety performance targets must: (1) Use obligation authority equal to the HSIP apportionment only for HSIP projects for the fiscal year prior to the year for which the safety performance targets were not met or significant progress was not made, and (2) submit an annual implementation plan that describes actions the State DOT will take to meet or make significant progress toward meeting its safety performance targets based on a detailed analysis, including analysis of crash types. Both of these provisions will facilitate transportation safety initiatives and improvements and help focus Federal resources in areas where Congress has deemed a national priority. In addition, these provisions help serve one of the overall goals of performance management—to improve accountability of the Federal-aid highway program (23 U.S.C. 150(a)). The implementation plan must: (a) Identify roadway features that constitute a hazard to road users; (b) identify highway safety improvement projects on the basis of crash experience, crash potential, or other data-supported means; (c) describe how HSIP funds will be allocated, including projects, activities, and strategies to be implemented; (d) describe how the proposed projects, activities, and strategies funded under the State HSIP will allow the State DOT to make progress toward achieving the safety performance targets; and (e) describe the actions the State DOT will undertake to meet or make significant progress toward meeting its performance targets.

The AASHTO and the States that supported AASHTO expressed concern that 23 U.S.C. 148(i) be implemented consistently and asked for clarification on several issues, including whether States subject to the 23 U.S.C. 148(i) provisions must obligate the funds in a single fiscal year or can program the funds over several years. The 23 U.S.C. 148(i)(1) states that "[the State shall] use obligation authority equal to the apportionment of the State for the prior year under section 104(b)(3) only for highway safety improvement projects. . . ." The FHWA believes that, under this provision, States must obligate such HSIP funds during the next fiscal year after the State is notified that FHWA

determined it did not meet or make significant progress toward meeting its targets. This provision reduces flexibility associated with a States' HSIP funds<sup>37</sup> and requires that those funds be focused on safety projects. In addition, this interpretation is consistent with how FHWA has proposed to implement the requirements related to the bridge and pavement minimum condition.<sup>38</sup> The FHWA will require the funds to be obligated in the next fiscal year, rather than the fiscal year when the State is notified, to allow the State time to plan and program projects so that the required obligation authority can be used on HSIP projects. Likewise, when FHWA notifies a State that it has met or made significant progress toward meeting its performance targets, that determination will be applied to the State's obligation authority for the upcoming fiscal year, and the implementation plan will be due by the beginning of that fiscal year.

The AASHTO and Minnesota DOT expressed concern that States may have difficulty delivering a full year's apportionment in these circumstances. The FHWA appreciates that concern and will work with affected States to expedite any necessary changes or project approvals. In order to give effect and meaning to 23 U.S.C. 148(i), which holds States accountable for making performance targets, FHWA believes it is appropriate to require that the obligation authority be used within the next fiscal year. As discussed earlier, FHWA believes this approach is consistent with the national goal of significantly reducing traffic fatalities and serious injuries. It would result in reducing flexibility associated with a State's HSIP funds and provide that the State focus those funds on safety projects. However, FHWA notes that while a State will be required to use obligation authority equal to a prior year HSIP apportionment on HSIP projects, the State retains flexibility on the remainder of its obligation authority.

The DVRPC asked for clarification on whether the 23 U.S.C. 148(i) provisions only apply to States that are determined

<sup>37</sup> 23 U.S.C. 148(i)(1) requires States to "use obligation authority equal to the apportionment of the State for the prior year under section 104(b)(3) only for highway safety improvement projects under this section until the Secretary determines that the State has met or made significant progress towards meeting the safety performance targets of the State."

<sup>38</sup> NPRM for the National Performance Management Measures; Assessing Pavement Condition for the National Highway Performance Program and Bridge Condition for the National Highway Performance Program 80 FR 326 (proposed January 5, 2015) <http://www.gpo.gov/fdsys/pkg/FR-2015-01-05/pdf/2014-30085.pdf>.



to not meet or make significant progress toward meeting their targets, and if the obligation authority restrictions are only for existing safety funds. The Oklahoma DOT asked for clarification on the intent of the provisions. As stated above, only States that do not meet or make significant progress toward meeting their targets are subject to the 23 U.S.C. 148(i) provisions in the subsequent fiscal year. In that year, such States must use obligation authority equal to the HSIP apportionment only for HSIP projects for the fiscal year prior to the year targets were established. States retain the authority to decide which HSIP projects will be obligated. The implementation plan should guide the State's project decisions so that the combined 23 U.S.C. 148(i) provisions lead to the State meeting or making significant progress toward meeting its safety performance targets in subsequent years.

The AASHTO commented that the implementation plan could lead to redundant, onerous reporting that adds no value to improving safety. The FHWA intends to issue additional guidance to States to meet the legislative requirements for the implementation plan while limiting redundancy and maximizing the opportunity to improve safety performance and States' ability to meet their targets.

The AASHTO and Missouri DOT also recommended that States be granted a waiver if a State can demonstrate that it is using all its obligation authority under 23 U.S.C. 104(b)(3), and that obligating additional amounts up to the apportioned amount will negatively affect the State's ability to meet or make significant progress toward meeting other required performance targets. The FHWA believes that both the plain language and intent of the statute (as this is one of the provisions where States are accountable for their targets) do not authorize FHWA to issue such waivers.

While Missouri DOT commented that the "penalties" imposed by the 23 U.S.C. 148(i) provisions are significant; many others, including the LAB and its supporters, the Tri-State Transportation Campaign, Smart Growth America and its supporters, and one citizen, commented that the provisions are meaningless and offer no real incentive for States to take the process seriously. The FHWA expects States and MPOs to be sincere in their efforts to implement performance management and to contribute to the national safety goal, and FHWA will implement these regulations to that end. This rule includes the maximum incentive

provided for in the statute for States to support the national safety goal.

The following example illustrates how these provisions would be carried out. A State DOT establishes targets for performance measures for CY 2018 and reports them in its 2017 HSIP annual report due by August 31, 2017. The targets established by the State for CY 2018 will be evaluated by FHWA when the CY 2018 FARS and HPMS data become available in approximately December of 2019, 1 year earlier than proposed in the NPRM. The FARS ARF will be used if Final FARS is not available. The serious injury data used for determining whether the State met or made significant progress toward meeting its serious injury targets will be taken from the State's 2019 HSIP report due by August 31, 2019. The FHWA will make a determination, inform the State DOT if it met or made significant progress toward meeting its CY 2018 safety performance targets, and send results to the State by March 31, 2020. If FHWA determines that the State did not meet or make significant progress toward meeting its CY 2018 safety performance targets, 23 U.S.C. 148(i) will apply for FY 2021. For FY 2021, the State would need to use obligation authority equal to the HSIP apportionment only for HSIP projects for FY 2017 (the fiscal year prior to the year for which the target was established) and submit an annual implementation plan that describes actions the State DOT will take to meet or make significant progress toward meeting targets based on a detailed analysis, including analysis of crash types. The implementation plan is due to FHWA before October 1, 2020, the beginning of FY 2021. Similarly, by March 31, 2021, FHWA will make a determination and inform the State DOT if it met or made significant progress toward meeting its CY 2019 safety performance targets. If the State has met or made significant progress toward meeting its targets, the State will still be required to use its FY 2021 obligation authority equal to the HSIP apportionment only for HSIP projects for FY 2017. For FY 2022, FHWA would not place any restrictions on the State's use of obligation authority since the State met or made significant progress toward meeting its CY 2019 safety performance targets.

For any year FHWA determines that a State DOT has met or made significant progress toward meeting its safety performance targets, that State DOT would not be required to use obligation authority or submit an implementation plan for the subsequent year. If, in some future year, FHWA determines that a

State DOT does not meet or make significant progress toward meeting performance targets, the State DOT would at that time need to submit an implementation plan as well as use obligation authority as described above.

In paragraph (e) of the final rule (paragraph (d) of the NPRM), FHWA indicates that it will first evaluate whether States have met or made significant progress toward meeting their targets when the performance data are available for the year for which the first targets are established—the end of the following calendar year. For example, data to evaluate CY 2018 targets will be available at the end of CY 2019. (FARS ARF will be used if Final FARS is not available.) The FHWA will make a determination and inform the State DOT if it met or made significant progress toward meeting its CY 2018 safety performance targets and send results to the State by March 31, 2020. The FHWA will make determinations annually thereafter. The language in the final rule is slightly different from what was proposed in the NPRM to provide consistency with statutory language regarding determining whether a State has met or made significant progress toward meeting its targets and because FHWA can make the evaluation earlier by using FARS ARF data if Final FARS is not available.

#### Section 490.213 Reporting of Targets for the Highway Safety Improvement Program

As proposed in the NPRM, FHWA adopts in § 490.213(a) reporting requirements, such that the State DOT reports its safety performance measures and targets in accordance with 23 CFR 924.15(a)(1)(iii) in the HSIP final rule published elsewhere in this issue of the **Federal Register**. The information in the HSIP reports, which are published on FHWA's Web site,<sup>39</sup> will improve the visibility and transparency of State fatal and serious injury data. In addition, FHWA is in the process of creating a new public Web site to help communicate the national performance story. The Web site will likely include infographics, tables, charts, and descriptions of the performance data that the State DOTs would be reporting to FHWA. The FHWA acknowledges that we received several comments related to the HSIP rule. For additional information on the new HSIP requirements, please review the HSIP

<sup>39</sup> <http://safety.fhwa.dot.gov/hsip/reports/>.

final rule published elsewhere in this issue of the **Federal Register**.<sup>40</sup>

In the NPRM, FHWA proposed that the manner in which MPOs report their established safety targets be documented in the Metropolitan Planning Agreement, which is regulated under 23 CFR part 450. The AASHTO, Iowa, and New York State DOTs suggested that the language regarding targets and Metropolitan Planning Agreements be changed to specify that State DOTs and MPOs agree to a reporting methodology, working within the intent of the established Metropolitan Planning Agreement, without requiring a modification to the Agreement. Those agencies did not support explicitly addressing a reporting methodology within the planning agreement itself, but suggested instead that each State should be able to develop a reporting system for its MPOs within the framework of the agreement. The NYSAMPO indicated that the mechanics of how targets are to be reported to the State need to be worked out with each MPO through its metropolitan planning agreement. New York State DOT indicated that because Metropolitan Planning Agreements are formal legal documents, modifying such documents would require the approval of all signatories, including executive and legal review at the State DOT level. The FHWA understands these concerns and revises § 490.213(b) to indicate that MPOs shall annually report their established safety targets to their respective State DOT, in a manner that is documented and mutually agreed upon by both parties. While the process needs to be documented, it does not need to be incorporated into the Metropolitan Planning Agreement.

In paragraph (c), as proposed in the NPRM, FHWA requires MPOs to report baseline safety performance and progress toward achievement of their targets in the system performance report in the metropolitan transportation plan, as provided in 23 U.S.C. 134(i)(2)(c). In the final rule, FHWA adds a listing of data sources upon which the safety performance measures and progress for MPOs are to be based, since the MPO VMT data source differs from the State VMT data source. The FHWA intends to issue guidance on estimating MPO VMT. The list of data sources includes the use of Final and FARS ARF data for fatalities (FARS ARF is used if Final FARS is not available), including non-motorized fatalities, the MPO VMT

estimate for rates, and State reported data for serious injuries, including non-motorized serious injuries.

## VI. Rulemaking Analyses and Notices

The FHWA considered all comments received before the close of business on the extended comment closing date indicated above, and the comments are available for examination in the docket (FHWA–2013–0020) at Regulations.gov. The FHWA also considered comments received after the comment closing date to the extent practicable. The FHWA also considered the HSIP provisions of the FAST Act in the development of this final rule. The FAST Act did not require additional provisions beyond those discussed in the NPRM.

### *Rulemaking Analysis and Notices Executive Order 12866 (Regulatory Planning and Review), Executive Order 13563 (Improving Regulation and Regulatory Review), and DOT Regulatory Policies and Procedures*

The FHWA has determined that this action is a significant regulatory action within the meaning of Executive Order (EO) 12866 and within the meaning of DOT regulatory policies and procedures due to the significant public interest in regulations related to traffic safety. It is anticipated that the economic impact of this rulemaking will not be economically significant within the meaning of EO 12866 as discussed below. This action complies with EOs 12866 and 13563 to improve regulation. This action is considered significant because of widespread public interest in the transformation of the Federal-aid highway program to be performance-based, although it is not economically significant within the meaning of EO 12866. The FHWA is presenting an RIA (or regulatory analysis) in support of the final rule on Safety Performance Measures for the HSIP. The regulatory analysis evaluates the economic impact, in terms of costs and benefits, on Federal, State, and local governments, as well as private entities regulated under this action, as required by EO 12866 and EO 13563. The estimated costs are measured on an incremental basis, relative to current safety performance reporting practices.

This section of the final rule identifies the estimated costs resulting from the final rule—and how many serious injuries and fatalities would need to be avoided to justify this rule—in order to inform policymakers and the public of the relative value of the final rule. The complete RIA may be accessed from the rulemaking's docket (FHWA–2013–0020). Each of the three performance measure final rulemakings will include

a discussion on the costs and benefits resulting from the requirements contained in each respective rulemaking; however, the third performance measure rule will provide a comprehensive discussion on the costs and benefits associated with all three performance measure rules for informational purposes.

The cornerstone of MAP–21's highway program transformation is the transition to a performance-based program. In accordance with the law, State DOTs will invest resources in projects to meet or make significant progress toward meeting performance targets that will make progress toward national goals. Safety is one goal area where MAP–21 establishes national performance goals for Federal-aid highway programs. The MAP–21 requires FHWA to promulgate a rule to establish safety performance measures.

### Estimated Costs of the Final Rule

To estimate costs for the final rule, FHWA assessed the level of effort, expressed in labor hours and the labor categories, needed for State and local transportation and law enforcement agencies to comply with each component of the final rule. Level of effort by labor category is monetized with loaded wage rates to estimate total costs.

Table 3 displays the total cost of the final rule for the 10-year study period (2015–2024). Total costs are estimated to be \$87.5 million undiscounted, \$65.6 million discounted at 7 percent, and \$76.9 million discounted at 3 percent. Costs associated with the establishment of performance targets make up 57 percent of the total costs of the final rule. This is an increase of 4 percent from the NPRM estimates resulting from costs associated with the new non-motorized fatalities and non-motorized serious injuries performance measure, added effort required for MPOs to estimate MPO-specific VMT for performance targets, a decrease in the number of MPOs expected to establish targets, and costs associated with coordination between State DOTs and MPOs. The costs in the tables assume 201 MPOs would establish their own targets, and the remaining portion would adopt State DOT targets. It is assumed that State DOTs and MPOs serving Transportation Management Areas (TMA)<sup>41</sup> will use staff to analyze safety trends and establish performance targets on an annual basis, and MPOs

<sup>40</sup> Highway Safety Improvement Program; Subchapter J—Highway Safety Rulemaking: <http://www.regulations.gov/#!docketDetail;D=FHWA-2013-0019>.

<sup>41</sup> A TMA is an urbanized area having a population of over 200,000 or otherwise requested by the Governor and the MPO and officially designated by FHWA or FTA. 23 U.S.C. 134(k).

not serving a TMA will adopt State DOT targets rather than establish their own safety performance targets and will therefore not incur any incremental costs. The FHWA made this assumption

because larger MPOs may have more resources available to develop performance targets. The FHWA believes that this is a conservative estimate, as larger MPOs may elect not

to establish their own targets for any variety of reasons, including resource availability.

TABLE 3—TOTAL COST OF THE FINAL RULE

Cost components	10-year total cost		
	Undiscounted	7%	3%
Section 490.205—Definitions .....	\$28,227,162	\$23,206,606	\$25,907,994
KABCO Compliance .....	373,324	373,324	373,324
Minor Revisions to Database .....	307,828	307,828	307,828
Convert Non-KABCO Data .....	65,495	65,495	65,495
MMUCC Compliance .....	27,329,875	22,309,319	25,010,707
Modifications to Database Platform .....	668,053	545,330	611,363
Modifications to PAR Report .....	1,128,776	921,418	1,032,990
Training for Law Enforcement .....	25,533,045	20,842,571	23,366,353
Establish 5-Year Rolling Average .....	523,963	523,963	523,963
Section 490.209—Establishment of Performance Targets .....	50,085,525	36,440,371	43,421,875
Coordination Between State DOTs and MPOs .....	867,367	810,623	842,103
Establish Performance Targets .....	49,218,159	35,629,748	42,579,772
Section 490.211—Determining Whether a State DOT has Met or Made Significant Progress Toward Meeting Performance Targets .....	9,170,764	5,947,112	7,577,340
Develop an Implementation Plan .....	9,170,764	5,947,112	7,577,340
Total Cost of Final Rule .....	87,483,450	65,594,089	76,907,209

\* Totals may not sum due to rounding.

The final rule's 10-year undiscounted cost (\$87.5 million in 2014 dollars) increased relative to the proposed rule (\$66.7 million in 2012 dollars). As discussed below, FHWA made a number of changes which affected cost.

#### General Updates

In the final rule RIA, FHWA updated all costs to 2014 dollars from 2012 dollars in the proposed rule. In addition, FHWA updated labor costs to reflect current BLS data. These general updates increased the estimated cost of the final rule relative to the proposed rule.

The FHWA also updated the estimated total number of MPOs to 409, which is less than the 420 MPOs used at the time that the NPRM was published. The estimated number of MPOs serving TMAs is now 201, less than the estimate of 210 in the NPRM, and the number of non-TMA MPOs is 208, less than the estimate of 210 in the NPRM. At the time the RIA was prepared for the NPRM, FHWA assumed that the 36 new urbanized areas resulting from the 2010 census would have MPOs designated for them. In reality, some of the newly designated urbanized areas merged with existing MPOs, resulting in the designation of fewer new MPOs than expected. The FHWA estimates that, on average, only the 201 larger MPOs serving TMAs will establish their own quantifiable performance targets and that the 208 smaller MPOs serving non-TMAs will

choose to agree to plan and program projects so that they contribute toward the accomplishment of the State DOT safety targets. The reduction in the number of MPOs decreased the estimated costs MPOs incur to comply with the requirements of this final rule relative to the proposed rule.

#### Section 490.205 Definitions

The RIA estimates the cost of § 490.205 resulting from the requirements for KABCO compliance, MMUCC, 4th edition compliance, and 5-year rolling average calculations. The cost associated with these rule requirements increased from \$26.3 million in the proposed rule to \$28.2 million in the final rule. In addition to the general updates described above, FHWA revised the final rule RIA to reflect updated local law enforcement census data, costs associated with the new non-motorized fatalities and non-motorized serious injuries performance measure, the removal of the proposed requirement for State DOTs to compile a 10-year historical trend line, and the deferred implementation of MMUCC, 4th edition compliance (required by 36 months after the effective date of the final rule, rather than the proposed 18 months).

#### Section 490.209 Establishment of Performance Targets

The RIA estimates the cost of coordination between State DOTs and MPOs as well as establishing

performance targets under § 490.209. The cost of this section increased from \$35.3 million for the proposed rule to \$50.1 million for the final rule. In addition to the general updates described above, the increase in cost is attributable to the additional costs associated with establishing the new non-motorized fatalities and non-motorized serious injuries performance measure (which added a one-time cost of approximately \$180,000, and approximately \$8 million over the 10 year period of analysis), the added effort required for MPOs to estimate MPO-specific VMT for performance targets (which is partially offset by a decrease in the number of MPOs expected to establish quantifiable targets), and costs of coordinating on the establishment of targets in accordance with 23 CFR part 450.

#### Section 490.211 Determining Whether a State DOT Has Met or Made Significant Progress Toward Meeting Performance Targets

In the RIA, FHWA estimates the cost associated with failing to meet or make significant progress toward meeting targets, as described in § 490.211. The cost of this section of the rule increased from \$5.1 million in the proposed rule to \$9.2 million in the final rule. In addition to the general updates described above, the increase in cost results from an increase in the estimated number of States that might not meet or make significant progress toward



meeting their targets using the new methodology included in the final rule. Based on the new methodology, FHWA conservatively assumed that 26 State DOTs will fail to meet or make significant progress toward meeting their targets, which is more than double the assumption used in the NPRM's RIA (10 State DOTs would fail to meet or make significant progress toward meeting their targets). The cost was partially offset by a reduction in the number of years the costs accrued.

In the RIA, FHWA recognizes that States will not incur incremental costs for using obligation authority equal to the HSIP apportionment only for HSIP projects for the prior year because programming decisions are already realized as part of the State's overall management of the Federal aid program.

#### Break-Even Analysis

Currently, there are many differences in the way State DOTs code and define safety performance measures (e.g., serious injuries). The rule will result in regulations that will: Improve data by providing for greater consistency in the reporting of serious injuries; require reporting on serious injuries and fatalities through a more visible and transparent reporting system; require the establishment and reporting of targets that can be aggregated at the national level; require State DOTs to

meet or make significant progress toward meeting their targets, and establish requirements for State DOTs that have not met or made significant progress toward meeting their targets.

Upon implementation, FHWA expects that the final rule will result in certain benefits. Specifically, FHWA expects safety investment decisionmaking to be more informed through the use of consistent and uniform measures; State DOTs and MPOs will be expected to use the information and data generated as a result of the new regulations to better inform their transportation planning and programming decisionmaking and more directly link investments to desired performance outcomes. In particular, FHWA expects that these new performance aspects of the Federal-aid program will help State DOTs and MPOs make better decisions on how to use resources in ways that will result in the greatest possible reduction in fatalities and serious injuries. These regulations will also help provide FHWA the ability to better communicate a national safety performance story. Each of these benefits is discussed in further detail in the RIA, available in the docket.

These benefits resulting from the rule (i.e., more informed decisionmaking, greater accountability, and greater focus on making progress toward the national goal for safety) will lead to improved

safety outcomes. However, the benefits from the rule, while real and substantial are difficult to monetize. Therefore, FHWA quantified these benefits of the rule by performing a break-even analysis, as described in OMB Circular A-4, that estimates the number of fatalities and incapacitating injuries<sup>42</sup> the rule will need to prevent for the benefits of the rule to justify the costs.

Table 4 displays the results from a break-even analysis using fatalities and incapacitating injuries as its reduction metric. The results show that the rule must prevent approximately 10 fatalities over 10 years to generate enough benefits to outweigh the cost of the rule. This translates to one fatality per year nationwide.<sup>43</sup> When the break-even analysis uses incapacitating injuries as the reduction metric, it shows that the rule must prevent 199 incapacitating injuries over 10 years, or approximately 20 a year, for benefits to outweigh the cost.<sup>44</sup> In other words, the rule will need to prevent approximately 10 fatalities or approximately 199 incapacitating injuries over 10 years nationwide for the rule to be cost-beneficial. Due to the relatively small break-even number of fatalities and incapacitating injuries, FHWA believes that the rule will surpass this threshold and that the benefits of the rule will outweigh the costs.

TABLE 4—BREAK-EVEN ANALYSIS USING FATALITIES AND INCAPACITATING INJURIES REDUCTION METRIC

Undiscounted 10-year costs	Reduction in fatalities required for rule to be cost-beneficial	Average annual reduction in fatalities required for rule to be cost-beneficial	Reduction in incapacitating injuries required for rule to be cost-beneficial	Average annual reduction in incapacitating injuries required for rule to be cost-beneficial
a	b = a ÷ \$9,200,000	c = b ÷ 10 years	d = a ÷ \$439,990	d = c ÷ 10 years
\$87,483,450 .....	9.5	1.0	198.8	19.9

Both of the thresholds in the break-even analysis increased in the final rule relative to the proposed rule. Specifically, the reduction in fatalities required for the rule to be cost-beneficial increased from 7 in the NPRM to 10 in the final rule, while the reduction in incapacitating injuries required for the rule to be cost-beneficial increased from 153 in the NPRM to 199 in the final rule. In both cases, the break-even points were affected by the increase in the undiscounted 10-year cost (which increased from \$66.7 million to \$87.5

million). In addition, the break-even points were affected by increases to both the VSL for fatalities and the average cost per incapacitating injury (the VSL for fatalities increased from \$9.1 million to \$9.2 million, while the average cost per incapacitating injury increased from \$435,000 to \$440,000).

#### Regulatory Flexibility Act

In compliance with the Regulatory Flexibility Act (Pub. L. 96-354, 5 U.S.C. 601-612), FHWA has evaluated the effects of this final rule on small entities and anticipates that this action would

not have a significant economic impact on a substantial number of small entities. The rule affects three types of entities: State governments, MPOs, and local law enforcement agencies. State governments do not meet the definition of a small entity.

The MPOs are considered governmental jurisdictions, so the small entity standard for these entities is whether the affected MPOs serve less than 50,000 people. The MPOs serve urbanized areas with populations of more than 50,000. Therefore, MPOs that incur economic impacts under this rule

<sup>42</sup> The FHWA used crash statistics from NHTSA's *Traffic Safety Facts 2012* to perform the break-even analysis. Because crash types are categorized using a KABCO scale in that report (i.e., fatality, incapacitating injury, non-incapacitating injury, or other injury), the results of the break-even analysis

are expressed in terms of incapacitating injury, and not serious injury.

<sup>43</sup> For reference, according to "NHTSA Traffic Safety Facts 2012," there were 33,561 fatalities in 2012.

<sup>44</sup> For reference, according to "NHTSA Traffic Safety Facts 2012," there were 182,000 incapacitating injuries in 2012.

do not meet the definition of a small entity.

Local law enforcement agencies, however, may be subsets of small governmental jurisdictions. Nonetheless, the RIA estimates minimal one-time costs to local law enforcement agencies, as discussed above, and these costs represent a fraction of a percent of revenues of a small government. Therefore, I hereby certify that this regulatory action would not have a significant impact on a substantial number of small entities.

#### *Unfunded Mandates Reform Act of 1995*

The FHWA has determined that this final rule would not impose unfunded mandates as defined by the Unfunded Mandates Reform Act of 1995 (Pub. L. 104-4, March 22, 1995, 109 Stat. 48). This rule does not contain a Federal mandate that may result in expenditures by State, local, and tribal governments, in the aggregate, or by the private sector, of greater than \$151 million or more in any 1 year (2 U.S.C. 1532). Additionally, the definition of “Federal mandate” in the Unfunded Mandates Reform Act excludes financial assistance of the type in which State, local, or tribal governments have authority to adjust their participation in the program in accordance with changes made in the program by the Federal Government. The Federal-aid highway program permits this type of flexibility.

#### *Executive Order 13132 (Federalism)*

The FHWA has analyzed this final rule in accordance with the principles and criteria contained in Executive Order 13132 dated August 4, 1999. The FHWA has determined that this action would not have sufficient federalism implications to warrant the preparation of a federalism assessment. The FHWA has also determined that this rulemaking would not preempt any State law or State regulation or affect the States’ ability to discharge traditional State governmental functions.

#### *Executive Order 12372*

*(Intergovernmental Review) Catalog of Federal Domestic Assistance Program Number 20.205, Highway Planning and Construction*

The regulations implementing EO 12372 regarding intergovernmental consultation on Federal programs and activities apply to this program. This EO applies because State and local governments would be directly affected by the proposed regulation, which is a condition on Federal highway funding. Local entities should refer to the Catalog of Federal Domestic Assistance Program

Number 20.205, Highway Planning and Construction, for further information.

#### *Paperwork Reduction Act*

Under the Paperwork Reduction Act of 1995 (PRA) (44 U.S.C. 3501, *et seq.*), Federal agencies must obtain approval from OMB prior to conducting or sponsoring a collection of information. Details and burdens in this final rule would be realized in Planning and HSIP reporting. The PRA activities are already covered by existing OMB Clearances. The reference numbers for those clearances are OMB: 2132-0529 (Planning) and 2125-0025 (HSIP), both with expiration date of May 31, 2017. Any increases in PRA burdens caused by MAP-21 in these areas were addressed in PRA approval requests associated with those rulemakings.

#### *National Environmental Policy Act*

The FHWA has analyzed this action for the purpose of the National Environmental Policy Act of 1969, as amended (42 U.S.C. 4321 *et seq.*), and has determined that this action would not have any effect on the quality of the environment and meets the criteria for the categorical exclusion at 23 CFR 771.117(c)(20).

#### *Executive Order 12630 (Taking of Private Property)*

The FHWA has analyzed this rule under EO 12630, Governmental Actions and Interference with Constitutionally Protected Property Rights. The FHWA does not anticipate that this action would affect a taking of private property or otherwise have taking implications under EO 12630.

#### *Executive Order 12988 (Civil Justice Reform)*

This action meets applicable standards in sections 3(a) and 3(b)(2) of EO 12988, Civil Justice Reform, to minimize litigation, eliminate ambiguity, and reduce burden.

#### *Executive Order 13045 (Protection of Children)*

The FHWA has analyzed this rule under EO 13045, Protection of Children from Environmental Health Risks and Safety Risks. The FHWA certifies that this action would not cause an environmental risk to health or safety that might disproportionately affect children.

#### *Executive Order 13175 (Tribal Consultation)*

The FHWA has analyzed this action under EO 13175, dated November 6, 2000, and believes that the action would not have substantial direct effects on

one or more Indian tribes; would not impose substantial direct compliance costs on Indian tribal governments; and would not preempt tribal laws. The final rule addresses obligations of Federal funds to States for Federal-aid highway projects and would not impose any direct compliance requirements on Indian tribal governments. Therefore, a tribal summary impact statement is not required.

#### *Executive Order 13211 (Energy Effects)*

The FHWA has analyzed this action under EO 13211, Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use. The FHWA has determined that this is not a significant energy action under that order and is not likely to have a significant adverse effect on the supply, distribution, or use of energy. Therefore, a Statement of Energy Effects is not required.

#### *Executive Order 12898 (Environmental Justice)*

The EO 12898 requires that each Federal agency make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minorities and low-income populations. The FHWA has determined that this rule does not raise any environmental justice issues.

#### *Regulation Identifier Number*

A RIN is assigned to each regulatory action listed in the Unified Agenda of Federal Regulations. The Regulatory Information Service Center publishes the Unified Agenda in April and October of each year. The RIN contained in the heading of this document can be used to cross-reference this action with the Unified Agenda.

#### **List of Subjects in 23 CFR Part 490**

Bridges, Highway safety, Highways and roads, Incorporation by reference, Reporting and recordkeeping requirements.

Issued on March 2, 2016 under authority delegated in 49 CFR 1.85.

**Gregory G. Nadeau,**

*Administrator, Federal Highway Administration.*

■ In consideration of the foregoing, FHWA amends title 23, Code of Federal Regulations, by adding part 490 to read as follows:

**PART 490—NATIONAL PERFORMANCE MANAGEMENT MEASURES**

**Subpart A—General Information**

Sec.

- 490.101 Definitions.
- 490.103 [Reserved]
- 490.105 [Reserved]
- 490.107 [Reserved]
- 490.109 [Reserved]
- 490.111 Incorporation by reference.

**Subpart B—National Performance Management Measures for the Highway Safety Improvement Program**

- 490.201 Purpose.
- 490.203 Applicability.
- 490.205 Definitions.
- 490.207 National performance management measures for the Highway Safety Improvement Program.
- 490.209 Establishment of performance targets.
- 490.211 Determining whether a State department of transportation has met or made significant progress toward meeting performance targets.
- 490.213 Reporting of targets for the Highway Safety Improvement Program.

**Authority:** 23 U.S.C. 134, 135, 148(i) and 150; 49 CFR 1.85.

**Subpart A—General Information**

**§ 490.101 Definitions.**

Unless otherwise specified, the following definitions apply to this part:

*Highway Performance Monitoring System (HPMS)* is a national level highway information system that includes data on the extent, condition, performance, use, and operating characteristics of the Nation's highways.

*Measure* means an expression based on a metric that is used to establish targets and to assess progress toward meeting the established targets (e.g., a measure for flight on-time performance is percent of flights that arrive on time, and a corresponding metric is an arithmetic difference between scheduled and actual arrival time for each flight).

*Metric* means a quantifiable indicator of performance or condition.

*Non-urbanized area* means a single geographic area that comprises all of the areas in the State that are not "urbanized areas" under 23 U.S.C. 101(a)(34).

*Target* means a quantifiable level of performance or condition, expressed as a value for the measure, to be achieved within a time period required by the Federal Highway Administration (FHWA).

**§ 490.103 [Reserved]**

**§ 490.105 [Reserved]**

**§ 490.107 [Reserved]**

**§ 490.109 [Reserved]**

**§ 490.111 Incorporation by reference.**

(a) Certain material is incorporated by reference into this part with the approval of the Director of the Federal Register under 5 U.S.C. 552(a) and 1 CFR part 51. To enforce any edition other than that specified in this section, FHWA must publish a notice of change in the **Federal Register** and the material must be available to the public. All approved material is available for inspection at the Federal Highway Administration, Office of Highway Policy Information (202–366–4631) and is available from the sources listed below. It is also available for inspection at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call 202–741–6030 or go to [http://www.archives.gov/federal-register/code\\_of\\_federal\\_regulations/ibr\\_locations.html](http://www.archives.gov/federal-register/code_of_federal_regulations/ibr_locations.html).

(b) [Reserved]

(c) [Reserved]

(d) American National Standards Institute, Inc., 1899 L Street NW., 11th Floor, Washington, DC 20036, (202) 293–8020, [www.ansi.org](http://www.ansi.org).

(1) ANSI D16.1–2007, Manual on Classification of Motor Vehicle Traffic Accidents. 7th Edition, approved August 2, 2007 (also available from National Safety Council, 1121 Spring Lake Drive, Itasca, Illinois 60143–3201, (<http://www.nrd.nhtsa.dot.gov/Pubs/07D16.pdf>) IBR approved for § 490.205.

(2) [Reserved]

(e) The U.S. Department of Transportation, 1200 New Jersey Avenue SE., Washington, DC 20590, [www.dot.gov](http://www.dot.gov).

(1) DOT HS 811 631, Model Minimum Uniform Crash Criteria (MMUCC) Guideline, 4th Edition, July 2012 (also available at [http://mmucc.us/sites/default/files/MMUCC\\_4th\\_Ed.pdf](http://mmucc.us/sites/default/files/MMUCC_4th_Ed.pdf)) IBR approved for §§ 490.205 and 490.207(c).

(2) [Reserved]

**Subpart B—National Performance Management Measures for the Highway Safety Improvement Program**

**§ 490.201 Purpose.**

The purpose of this subpart is to implement the requirements of 23 U.S.C. 150(c)(4), which requires the Secretary of Transportation to establish performance measures for the purpose of carrying out the Highway Safety Improvement Program (HSIP) and for

State departments of transportation (State DOTs) to use in assessing:

- (a) Serious injuries and fatalities per vehicle miles traveled (VMT); and
- (b) Number of serious injuries and fatalities.

**§ 490.203 Applicability.**

The performance measures are applicable to all public roads covered by the HSIP carried out under 23 U.S.C. 130 and 148.

**§ 490.205 Definitions.**

Unless otherwise specified, the following definitions apply in this subpart:

*5-year rolling average* means the average of 5 individual, consecutive annual points of data (e.g., the 5-year rolling average of the annual fatality rate).

*Annual Report File (ARF)* means FARS data that are published annually, but prior to Final FARS data.

*Fatality Analysis Reporting System (FARS)* means a nationwide census providing public yearly data regarding fatal injuries suffered in motor vehicle traffic crashes.

*Final FARS* means the FARS data that replace the ARF file and contain additional cases or updates to cases that became available after the ARF was released, and which are no longer subject to future changes.

*KABCO* means the coding convention system for injury classification established by the National Safety Council.

*Number of fatalities* means the total number of persons suffering fatal injuries in a motor vehicle traffic crash during a calendar year, based on the data reported by the FARS database.

*Number of non-motorized fatalities* means the total number of fatalities (as defined in this section) with the FARS person attribute codes: (5) Pedestrian, (6) Bicyclist, (7) Other Cyclist, and (8) Person on Personal Conveyance.

*Number of non-motorized serious injuries* means the total number of serious injuries (as defined in this section) where the injured person is, or is equivalent to, a pedestrian (2.2.36) or a pedalcyclist (2.2.39) as defined in the ANSI D16.1–2007 (incorporated by reference, see § 490.111).

*Number of serious injuries* means the total number of persons suffering at least one serious injury for each separate motor vehicle traffic crash during a calendar year, as reported by the State, where the crash involves a motor vehicle traveling on a public road, and the injury status is "suspected serious injury (A)" as described in MMUCC, (incorporated by reference, see



§ 490.111). For serious injury classifications that are not MMUCC compliant, the number of serious injuries means serious injuries that are converted to KABCO by use of conversion tables developed by the NHTSA.

*Public road* is as defined in 23 CFR 924.3.

*Rate of fatalities* means the ratio of the total number of fatalities (as defined in this section) to the number of vehicle miles traveled (VMT) (expressed in 100 million VMT) in a calendar year.

*Rate of serious injuries* means the ratio of the total number of serious injuries (as defined in this section) to the number of VMT (expressed in 100 million vehicle miles of travel) in a calendar year.

*Serious injuries* means:

(1) From April 14, 2016 to April 15, 2019, injuries classified as “A” on the KABCO scale through use of the conversion tables developed by NHTSA; and

(2) After April 15, 2019, “suspected serious injury (A)” as defined in the MMUCC.

**§ 490.207 National performance management measures for the Highway Safety Improvement Program.**

(a) There are five performance measures for the purpose of carrying out the HSIP. They are:

- (1) Number of fatalities;
- (2) Rate of fatalities;
- (3) Number of serious injuries;
- (4) Rate of serious injuries; and,
- (5) Number of non-motorized fatalities and non-motorized serious injuries.

(b) Each performance measure is based on a 5-year rolling average. The performance measures are calculated as follows:

(1) The performance measure for the number of fatalities is the 5-year rolling average of the total number of fatalities for each State and shall be calculated by adding the number of fatalities for each of the most recent 5 consecutive years ending in the year for which the targets are established, dividing by 5, and rounding to the tenth decimal place. FARS ARF may be used if Final FARS is not available.

(2) The performance measure for the rate of fatalities is the 5-year rolling average of the State’s fatality rate per VMT and shall be calculated by first calculating the number of fatalities per 100 million VMT for each of the most recent 5 consecutive years ending in the year for which the targets are established, adding the results, dividing by 5, and rounding to the thousandth decimal place. The FARS ARF may be used if Final FARS is not available.

State VMT data are derived from the HPMS. The Metropolitan Planning Organizations (MPO) VMT is estimated by the MPO. The sum of the fatality rates is divided by five and then rounded to the thousandth decimal place.

(3) The performance measure for the number of serious injuries is the 5-year rolling average of the total number of serious injuries for each State and shall be calculated by adding the number of serious injuries for each of the most recent 5 consecutive years ending in the year for which the targets are established, dividing by five, and rounding to the tenth decimal place.

(4) The performance measure for the rate of serious injuries is the 5-year rolling average of the State’s serious injuries rate per VMT and shall be calculated by first calculating the number of serious injuries per 100 million VMT for each of the most recent 5 consecutive years ending in the year for which the targets are established, adding the results, dividing by five, and rounding to the thousandth decimal place. State VMT data are derived from the HPMS. The MPO VMT is estimated by the MPO.

(5) The performance measure for the number of Non-motorized Fatalities and Non-motorized Serious Injuries is the 5-year rolling average of the total number of non-motorized fatalities and non-motorized serious injuries for each State and shall be calculated by adding the number of non-motorized fatalities to the number non-motorized serious injuries for each of the most recent 5 consecutive years ending in the year for which the targets are established, dividing by five, and rounding to the tenth decimal place. FARS ARF may be used if Final FARS is not available.

(c) For purposes of calculating serious injuries in paragraphs (b)(3), (4), and (5) of this section:

(1) Before April 15, 2019, serious injuries may be determined by either of the following:

- (i) Serious injuries coded (A) in the KABCO injury classification scale through use of the NHTSA serious injuries conversion tables; or
- (ii) Using MMUCC (incorporated by reference, see § 490.111).

(2) By April 15, 2019, serious injuries shall be determined using MMUCC.

**§ 490.209 Establishment of performance targets.**

(a) State DOTs shall establish targets annually for each performance measure identified in § 490.207(a) in a manner that is consistent with the following:

(1) State DOT targets shall be identical to the targets established by the State

Highway Safety Office for common performance measures reported in the State’s Highway Safety Plan, subject to the requirements of 23 U.S.C. 402(k)(4), and as coordinated through the State Strategic Highway Safety Plan.

(2) State DOT targets shall represent performance outcomes anticipated for the calendar year following the HSIP annual report date, as provided in 23 CFR 924.15.

(3) State DOT performance targets shall represent the anticipated performance outcome for all public roadways within the State regardless of ownership or functional class.

(4) State DOT targets shall be reported in the HSIP annual report that is due after April 14, 2017, and in each subsequent HSIP annual report thereafter.

(5) The State DOT shall include, in the HSIP Report (see 23 CFR part 924), at a minimum, the most recent 5 years of serious injury data and non-motorized serious injury data. The serious injury data shall be either MMUCC compliant or converted to the KABCO system (A) for injury classification through use of the NHTSA conversion tables as required by § 490.207(c).

(6) Unless approved by FHWA and subject to § 490.209(a)(1), a State DOT shall not change one or more of its targets for a given year once it is submitted in the HSIP annual report.

(b) In addition to targets described in paragraph (a) of this section, State DOTs may, as appropriate, for each target in paragraph (a) establish additional targets for portions of the State.

(1) A State DOT shall declare and describe in the State HSIP annual report required by § 490.213 the boundaries used to establish each additional target.

(2) State DOTs may select any number and combination of urbanized area boundaries and may also select a single non-urbanized area boundary for the establishment of additional targets.

(3) The boundaries used by the State DOT for additional targets shall be contained within the geographic boundary of the State.

(4) State DOTs shall evaluate separately the progress of each additional target and report that progress in the State HSIP annual report (see 23 CFR part 924).

(c) The Metropolitan Planning Organizations (MPO) shall establish performance targets for each of the measures identified in § 490.207(a), where applicable, in a manner that is consistent with the following:

(1) The MPOs shall establish targets not later than 180 days after the respective State DOT establishes and

reports targets in the State HSIP annual report.

(2) The MPO target shall represent performance outcomes anticipated for the same calendar year as the State target.

(3) After the MPOs within each State establish the targets, the State DOT must be able to provide those targets to FHWA, upon request.

(4) For each performance measure, the MPOs shall establish a target by either:

(i) Agreeing to plan and program projects so that they contribute toward the accomplishment of the State DOT safety target for that performance measure; or

(ii) Committing to a quantifiable target for that performance measure for their metropolitan planning area.

(5) The MPOs that establish quantifiable fatality rate or serious injury rate targets shall report the VMT estimate used for such targets and the methodology used to develop the estimate. The methodology should be consistent with other Federal reporting requirements, if applicable.

(6) The MPO targets established under paragraph (c)(4) of this section specific to the metropolitan planning area shall represent the anticipated performance outcome for all public roadways within the metropolitan planning boundary regardless of ownership or functional class.

(d)(1) The State DOT and relevant MPOs shall coordinate on the establishment of targets in accordance with 23 CFR part 450 to ensure consistency, to the maximum extent practicable.

(2) The MPOs with multi-State boundaries that agree to plan and program projects to contribute toward State targets in accordance with paragraph (c)(4)(i) of this section shall plan and program safety projects in support of the State DOT targets for each area within each State (e.g., MPOs that extend into two States shall agree to plan and program projects to contribute toward two separate sets of targets (one set for each State)).

**§ 490.211 Determining whether a State department of transportation has met or made significant progress toward meeting performance targets.**

(a) The determination for having met or made significant progress toward meeting the performance targets under 23 U.S.C. 148(i) will be determined based on:

(1) The most recent available Final FARS data for the fatality number. The FARS ARF may be used if Final FARS is not available;

(2) The most recent available Final FARS and HPMS data for the fatality rate. The FARS ARF may be used if Final FARS is not available;

(3) The most recent available Final FARS data for the non-motorized fatality number. The FARS ARF may be used if Final FARS is not available;

(4) State reported data for the serious injuries number;

(5) State reported data and HPMS data for the serious injuries rate; and

(6) State reported data for the non-motorized serious injuries number.

(b) The State-reported serious injury data and non-motorized serious injury data will be taken from the HSIP report in accordance with 23 CFR part 924.

(c) The FHWA will evaluate whether a State DOT has met or made significant progress toward meeting performance targets.

(1) The FHWA will not evaluate any additional targets a State DOT may establish under § 490.209(b).

(2) A State DOT is determined to have met or made significant progress toward meeting its targets when at least four of the performance targets established under § 490.207(a) are:

(i) Met; or

(ii) The outcome for a performance measure is less than the 5-year rolling average data for the performance measure for the year prior to the establishment of the State's target. For example, of the State DOT's five performance targets, the State DOT is determined to have met or made significant progress toward meeting its targets if it met two targets and the outcome is less than the measure for the year prior to the establishment of the target for two other targets.

(d) If a State DOT has not met or made significant progress toward meeting performance targets in accordance with paragraph (c) of this section, the State DOT must comply with 23 U.S.C. 148(i) for the subsequent fiscal year.

(e) The FHWA will first evaluate whether a State DOT has met or made significant progress toward meeting performance targets after the calendar year following the year for which the first targets are established, and then annually thereafter.

**§ 490.213 Reporting of targets for the Highway Safety Improvement Program.**

(a) The targets established by the State DOT shall be reported to FHWA in the State's HSIP annual report in accordance with 23 CFR part 924.

(b) The MPOs shall annually report their established safety targets to their respective State DOT, in a manner that is documented and mutually agreed upon by both parties.

(c) The MPOs shall report baseline safety performance, VMT estimate and methodology if a quantifiable rate target was established, and progress toward the achievement of their targets in the system performance report in the metropolitan transportation plan in accordance with 23 CFR part 450. Safety performance and progress shall be reported based on the following data sources:

(1) The most recent available Final FARS data for the fatality number. The FARS ARF may be used if Final FARS is not available;

(2) The most recent available Final FARS and MPO VMT estimate for the fatality rate. The FARS ARF may be used if Final FARS is not available;

(3) The most recent available Final FARS data for the non-motorized fatality number. The FARS ARF may be used if Final FARS is not available;

(4) State reported data for the serious injuries number;

(5) State reported data and MPO VMT estimate for the serious injuries rate; and

(6) State reported data for the non-motorized serious injuries number.

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## DEPARTMENT OF TRANSPORTATION

### Federal Highway Administration

#### 23 CFR Part 490

[Docket No. FHWA–2013–0053]

RIN 2125–AF53

#### National Performance Management Measures; Assessing Pavement Condition for the National Highway Performance Program and Bridge Condition for the National Highway Performance Program

**AGENCY:** Federal Highway Administration (FHWA), Department of Transportation (DOT).

**ACTION:** Final rule.

**SUMMARY:** The purpose of this final rule is to establish measures for State departments of transportation (State DOT) to use to carry out the National Highway Performance Program (NHPP) and to assess the condition of the following: Pavements on the National Highway System (NHS) (excluding the Interstate System), bridges carrying the NHS which includes on- and off-ramps connected to the NHS, and pavements on the Interstate System. The NHPP is a core Federal-aid highway program that provides support for the condition and performance of the NHS and the construction of new facilities on the NHS. The NHPP also ensures that investments of Federal-aid funds in highway construction are directed to support progress toward the achievement of performance targets established in a State's asset management plan for the NHS. This final rule establishes regulations for the new performance aspects of the NHPP that address measures, targets, and reporting. The FHWA is in the process of creating a new public Web site to help communicate the national performance story. The Web site will likely include infographics, tables, charts, and descriptions of the performance data that State DOTs report to FHWA. The FHWA issues this final rule based on sec. 1203 of MAP–21, which identifies national transportation goals and requires the Secretary to promulgate rules to establish performance measures and standards in specified Federal-aid highway program areas.

**DATES:** This final rule is effective February 17, 2017. The incorporation by reference of certain publications listed in the regulation is approved by the Director of the Federal Register as of February 17, 2017.

**FOR FURTHER INFORMATION CONTACT:** For technical information: Francine Shaw–Whitson, Office of Infrastructure, 202–366–8028. For legal information: Anne Christenson, Office of Chief Counsel, 202–366–0740, Federal Highway Administration, 1200 New Jersey Avenue SE., Washington, DC 20590. Office hours are from 8:00 a.m. to 4:30 p.m. e.t., Monday through Friday, except Federal holidays.

#### SUPPLEMENTARY INFORMATION

##### Electronic Access and Filing

The notice of proposed rulemaking (NPRM) was published at 80 FR 326 on January 5, 2015, and all comments received may be viewed online at <http://www.regulations.gov>. Electronic retrieval help and guidelines are available on the Web site. It is available 24 hours each day, 365 days each year. An electronic copy of this document may also be downloaded from the Office of the Federal Register's Web site at <http://www.orf.gov> and the Government Printing Office's Web site at <http://www.gpo.gov>.

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#### I. Executive Summary

##### A. Incorporating the FAST Act

On December 4, 2015, the President signed the Fixing America's Surface Transportation Act (FAST) Act (Pub. L. 114–94) into law. For the most part, the FAST Act is consistent with the new performance management elements introduced by MAP–21. For convenience and accurate historical context, this rule will refer to MAP–21 throughout the preamble to signify the fundamental changes MAP–21 made to States' authorities and responsibilities

for overseeing the implementation of performance management. For this final rule, there are two areas where the FAST Act made changes to performance management requirements.

The first change is sec. 119(e)(7), title 23, United States Code (23 U.S.C. 119(e)(7)), which relates to the requirement for a significant progress determination for NHPP targets. The FAST Act amended this provision to remove the term “2 consecutive reports.” The FHWA has incorporated this change into the final rule by removing the term “2 consecutive determinations,” which was proposed in section 490.109(f) of the NPRM, published January 5, 2015 (80 FR 326). In section 490.109(f) of the NPRM, FHWA proposed that if FHWA determines that a State DOT has not made significant progress toward achieving NHPP targets in two consecutive FHWA determinations, then that State DOT would document the actions it will take to achieve the targets in its next Biennial Performance Report. The FAST Act changed this requirement. Due to the FAST Act, the final rule requires State DOTs to take action when they do not make significant progress for each biennial determination (instead of 2 consecutive biennial determinations) made by FHWA.

The second change made by the FAST Act is removal of the term “2 consecutive reports” in 23 U.S.C. 119(f)(1)(A), which relates to triggering the penalty for Interstate pavement condition that has fallen below the minimum condition level established under this rule. In section 490.317 of the NPRM, FHWA proposed that it would determine annually whether or not a State DOT's Interstate pavement condition is below the minimum condition level. If FHWA determines that a State DOT's Interstate pavement condition is below the minimum condition level for the “most recent 2 years,” then that State DOT would be subject to the penalty under 23 U.S.C. 119(f)(1)(A). A description and example application on this penalty is available for review on the docket. Due to the FAST Act, the final rule subjects State DOTs to the penalty under 23 U.S.C. 119(f)(1)(A) if FHWA determines that its Interstate pavement condition has fallen below the minimum condition level for the most recent year (instead of most recent 2 years).

##### B. Purpose of the Regulatory Action

The MAP–21 (Pub. L. 112–141) transforms the Federal-aid highway program by establishing new requirements for performance



management to ensure the most efficient investment of Federal transportation funds. Performance management increases the accountability and transparency of the Federal-aid highway program and provides a framework to support improved investment decisionmaking through a focus on performance outcomes for key national transportation goals.

As part of performance management, recipients of Federal-aid highway funds will make transportation investments to achieve performance targets that make progress toward national goals. The national performance goal for bridge and pavement condition is to maintain the condition of highway infrastructure assets in a state of good repair. The purpose of this final rule is to implement MAP-21 and FAST Act performance management requirements.

Prior to MAP-21, there were no explicit requirements for State DOTs to demonstrate how their transportation program supported national performance outcomes. State DOTs were not required to measure condition or performance, establish targets, assess progress toward targets, or report on condition or performance in a nationally consistent manner that FHWA could use to assess the entire system. Without State DOTs reporting on the above factors, it is difficult for FHWA to look at the effectiveness of the Federal-aid highway program as a means to address surface transportation performance at a national level.

This final rule is one of several rulemakings that DOT has or is conducting to implement MAP-21's new performance management framework. The collective rulemakings will establish the regulations needed to more effectively evaluate and report on surface transportation performance across the Nation. This final rule will:

- Require State DOTs to maintain their bridges and pavements at or above a minimum condition level;
- Provide for greater consistency in the reporting of condition and performance;
- Require the establishment of targets that can be aggregated at the national level;
- Improve transparency by requiring consistent reporting on progress through a public reporting system;
- Require State DOTs to make significant progress toward meeting their targets; and
- Establish requirements for State DOTs that have not met or made significant progress toward meeting their targets.

State DOTs and metropolitan planning organizations (MPO) will be

expected to use the information and data generated as a result of the new regulations to inform their transportation planning and programming decisions. The new performance aspects of the Federal-aid highway program that result from this rule will provide FHWA the ability to better communicate a national performance story and to more reliably assess the impacts of Federal funding investments. The FHWA is in the process of creating a new public Web site to help communicate the national performance story. The Web site will likely include infographics, tables, charts, and descriptions of the performance data that State DOTs would be reporting to FHWA.

The FHWA is required to establish performance measures to assess performance in 12 areas<sup>1</sup> generalized as follows: (1) Serious injuries per vehicle miles traveled (VMT); (2) fatalities per VMT; (3) number of serious injuries; (4) number of fatalities; (5) pavement condition on the Interstate System; (6) pavement condition on the non-Interstate NHS; (7) bridge condition on the NHS; (8) traffic congestion; (9) on-road mobile source emissions; (10) freight movement on the Interstate System; (11) performance of the Interstate System; and (12) performance of the non-Interstate NHS. This rulemaking is the second of three that establish performance measures for State DOTs and MPOs to use to carry out Federal-aid highway programs and to assess performance in each of these 12 areas. This final rule establishes national measures for pavement condition on the Interstate System and non-Interstate NHS and bridge condition on the NHS (numbers 5, 6 and 7 in the above list). Other rulemakings have or will establish national measures for the remaining areas.

State DOTs will be required to establish performance targets and assess performance in 12 areas<sup>2</sup> established by MAP-21, and FHWA will assess<sup>3</sup> their progress toward meeting targets in 10 of these areas<sup>4</sup> in accordance with MAP-21 and the FAST Act. State DOTs that

<sup>1</sup> These areas are listed within 23 U.S.C. 150(c), which requires the Secretary to establish measures to assess performance or condition.

<sup>2</sup> These areas are listed within 23 U.S.C. 150(c), which requires the Secretary to establish measures to assess performance or condition.

<sup>3</sup> 23 U.S.C. 148(i) and 23 U.S.C. 119(e)(7).

<sup>4</sup> Serious injuries per vehicle VMT; fatalities per VMT; number of serious injuries; number of fatalities; pavement condition on the Interstate System; pavement condition on the non-Interstate NHS; bridge condition on the NHS; performance of the Interstate System; and performance of the non-Interstate NHS under MAP-21. Freight movement on the Interstate System under the FAST Act.

fail to meet or make significant progress toward meeting pavement and bridge condition performance targets in a biennial performance reporting period will be required to document the actions they will undertake to achieve their targets in their next biennial performance report.

This final rule establishes performance measures to assess pavement and bridge conditions on the Interstate System and non-Interstate NHS for the purpose of carrying out the NHPP. The four measures to assess pavement condition are: (1) Percentage of pavements on the Interstate System in Good condition; (2) percentage of pavements on the Interstate System in Poor condition; (3) percentage of pavements on the NHS (excluding the Interstate System) in Good condition; and (4) percentage of pavements on the NHS (excluding the Interstate System) in Poor condition. The two performance measures for assessing bridge condition are: (1) Percentage of NHS bridges classified as in Good condition; and (2) percentage of NHS bridges classified as in Poor condition.

This final rule also establishes the minimum level for pavement condition for the Interstate System as required by the statute and incorporates the minimum condition level for bridges carrying the NHS which includes on- and off-ramps connected to the NHS as established by the statute. In addition, this final rule establishes the process for State DOTs and MPOs to use to establish and report targets and the process that FHWA will use to assess the progress State DOTs have made in achieving targets.

Lastly, FHWA recognizes that implementation of the performance management requirements in this final rule will evolve with time for a variety of reasons such as: The introduction of new technologies that allow for the collection of more nationally consistent and/or reliable performance data; shifts in national priorities for the focus of a goal area; new federal requirements; or the emergence of improved approaches to measure condition/performance in supporting investment decisions and national goals. The FHWA is committed to performing a retrospective review of this rule after the first performance period, to assess the effectiveness of the requirements to identify any necessary changes to better support investment decisions through performance-based planning and programming and to ensure the most efficient investment of Federal transportation funds. In implementation of this rule, FHWA realizes that there are multiple ways that State DOTs and MPOs can make

decisions to achieve more efficient and cost effective investments; as part of a retrospective review, FHWA will also utilize implementation surveys to identify how agencies complying with the rule are developing their programs and selecting their projects to achieve targets.

### *C. Summary of the Major Provisions of the Regulatory Action in Question*

This final rule retains the majority of the major provisions of the NPRM but makes significant changes by:

- Originally anticipating the rule's effective date as fall 2016, FHWA has now postponed the Baseline Performance Period Report and subsequent biennial reports by 2 years relative to those described in the NPRM (*i.e.*, from 2016 to 2018);
- Removing the requirements for State DOTs to declare and describe NHS limits in their Baseline Performance Period Report;
- Adding guidance for MPO target establishment to address situations where metropolitan planning areas extend across multiple States;
- Removing the requirement to use the Metropolitan Planning Agreement as the means to document how MPOs report their established and adjusted targets to their respective State DOTs;
- Clarifying the list of extenuating circumstances that may prevent a State DOT from making significant progress to include the sudden discontinuation of federally furnished data due to lack of Federal funding;
- Removing references to provisional American Association of State Highway and Transportation Officials (AASHTO) standards to ensure consistency in reporting year over year (including references to PP68–14, PP69–14, and PP70–14);
- Providing an option for State DOTs to report Present Serviceability Rating (PSR) for highways with a posted speed limit under 40 miles per hour (MPH) in place of International Roughness Index (IRI), cracking, rutting, and faulting;
- Changing the threshold for pavements with Poor IRI condition to greater than 170 inches per mile for all areas, rather than the NPRM's proposed threshold of 220 inches per mile for urbanized areas with a population greater than 1 million people;
- Changing the threshold for Poor crack rating for asphalt pavement sections from greater than 10 percent to greater than 20 percent and the threshold for Poor crack rating for jointed concrete pavement sections from greater than 10 percent to greater than 15 percent;

- Changing the threshold for Good faulting rating for jointed concrete pavement sections from less than 0.05 inch to less than 0.1 inch;
- Revising the network coverage of data reporting requirements for Interstate pavement condition from both directions of mainline highways to single, inventory direction of mainline highways;
- Changing the approach in dealing with missing, unresolved, or invalid pavement data;
  - Removing the proposed language on rating sections with missing, unresolved, or invalid data as Poor condition; and
  - Revising the requirements for reporting on sections with missing, unresolved, or invalid data. In the final rule, no more than 5 percent of the network is to be represented with missing, unresolved, or invalid data due to construction, closure, disaster, flood, deterioration or any other reasons;
- Revising the equation for calculating the percentage of missing, unresolved, or invalid data so that it is based on total lane-miles of the system excluding bridges and unpaved and “other” surface types instead of total lane-miles of the system;
- Adjusting the minimum condition standards for pavement condition on the Interstate highways for Alaska because Highway Performance Monitoring System (HPMS) data indicated that a regional adjustment was needed for this State;
- Revising the definition and computation for the classification of structurally deficient; and
- Providing a transition period for implementing the revised definition and computation for the classification of structurally deficient, and using the new calculations for deck area of culverts and border bridges.

The FHWA updated these and other elements in this final rule based on the review and analysis of comments received. For additional detail on all the changes FHWA made in the final rule, please refer to Section VI of this document. The following is a summary of the final rule. Section references below refer to sections of the regulatory text for title 23 of the Code of Federal Regulations (23 CFR).

This final rule adds to subpart A general information applicable to part 490, to include requirements for target establishment, reporting on progress, and how determinations would be made on whether State DOTs have made significant progress toward NHPP targets. Subpart A also includes definitions and clarifies terminology associated with target establishment,

reporting, and making significant progress. Lastly, subpart A incorporates by reference the HPMS Field Manual, the Recording and Coding Guide for the Structure Inventory and Appraisal of the Nation's Bridges, Report No. FHWA–PD–96–001 (December 1995) and errata, and several of the AASHTO standards. Section 490.105 describes the process to be used by State DOTs and MPOs to establish targets for each of the four pavement and two bridge measures. The State DOTs will establish 2- and 4-year targets for a 4-year performance period for the condition of infrastructure assets. State DOTs will establish their first statewide targets 1 year after the effective date of this rule. The MPOs will establish targets by either supporting a State DOT's statewide target, or defining a target unique to the metropolitan area each time State DOTs establish a target. The MPOs have up to 180 days after State DOTs establish their pavement and bridge condition targets to establish their own targets. The FHWA has placed a timeline on the docket that illustrates how this transition could be implemented.

Section 490.107 identifies performance reporting requirements for State DOTs and MPOs. The State DOT will submit its established targets in a baseline report at the beginning of the performance period and report progress at the midpoint and end of the performance period. State DOTs will be allowed to adjust their 4-year target at the midpoint of the performance period. The MPOs are not required to provide separate reporting to FHWA. However, State DOTs and MPOs will need to coordinate and mutually agree to a target establishment reporting process. Coordination will also be required between State DOTs and MPOs if a State DOT adjusts its 4-year target at the midpoint of the performance period.

Section 490.109 establishes the method FHWA will use to determine if State DOTs have achieved or have made significant progress toward the achievement of their NHPP targets. Significant progress will be determined from an analysis of estimated condition/performance and measured condition/performance of each of the NHPP targets. If applicable, State DOTs will have the opportunity to discuss why targets were not achieved or significant progress was not made. If a State DOT fails to achieve significant progress in a biennial performance reporting period, then it is required to document the actions they will undertake to achieve their targets in the next biennial performance report (though encouraged to document sooner).

Subparts C and D establish performance measures and other related requirements to assess pavement and bridge conditions. In subparts C and D, sections 490.305 and 490.405 establish program-specific definitions to ensure that the performance measures are clear and consistent.

Sections 490.307 and 490.407 require that State DOTs and MPOs use a total of six measures to assess the condition of pavements and bridges on the NHS. The pavement measures will be applicable to both Interstate and non-Interstate NHS mainline roads and the bridge measures would be applicable for all bridges carrying the NHS which includes on- and off-ramps connected to the NHS. Both the pavement and bridge measures will reflect the percentage of the system in Good and Poor condition. The measure calculations will utilize data documented in the HPMS and in the National Bridge Inventory (NBI).

Section 490.315 establishes the minimum level for condition of pavements on the Interstate System as required by 23 U.S.C. 150(c)(3)(A)(iii).

Section 490.411 incorporates the minimum level for condition of bridges as required by 23 U.S.C. 119(f)(2).

#### *D. Costs and Benefits*

The FHWA estimated the incremental costs associated with the new requirements that represent a change to current practices of State DOTs and MPOs.<sup>5</sup> The FHWA also estimated the incremental costs associated with the new requirements proposed in this regulatory action. The new requirements represent a change to the current practices of State DOTs and MPOs. The FHWA derived the costs of the new requirements by assessing the expected increase in the level of labor effort for FHWA, State DOTs, and MPOs to standardize and update data collection and reporting systems and establish and report targets.

The FHWA derived the costs of each of these components by assessing the expected increase in level of labor effort and additional capital needed to standardize and update State DOT data collection and reporting systems and to establish and report targets. The FHWA sought opinions from pavement and bridge subject matter experts (SMEs) to estimate impacts of the final rule. Cost estimates were developed based on assumptions based on information received from SMEs.

To estimate costs, FHWA multiplied the level of effort, expressed in labor

hours, with a corresponding loaded wage rate that varied by the type of laborer needed to perform the activity.<sup>6</sup> Where necessary, capital costs were also included. Following this approach, the 10-year undiscounted incremental costs to comply with this rule are \$156.0 million.

The final rule's 10-year undiscounted cost (\$156.0 million in 2014 dollars) decreased from the proposed rule (\$196.4 million in 2012 dollars). The FHWA made several changes that affected the cost estimate. These changes include updating costs to 2014 dollars from 2012 dollars and labor costs to reflect current Bureau of Labor Statistics (BLS) data. In addition, FHWA revised the final rule Regulatory Impact Analysis (RIA) to reflect: (1) The deferment of the effective date; (2) the postponed implementation of establishing and updating performance targets, reporting on performance targets, and assessing significant progress toward achieving performance targets; (3) a decrease in the number of MPOs expected to establish quantifiable targets and upgrade software; (4) the costs of coordinating the establishment of targets in accordance with 23 CFR 450; (5) a decrease in pavement data collection requirements for State DOTs; and (6) added effort for State DOTs to collect data on the non-Interstate NHS.

The FHWA expects that the rule will result in significant benefits, although they are not easily quantifiable. The rule will yield greater accountability because MAP-21 mandated reporting increases visibility and transparency. The data reported to FHWA will be consistent across the States and will be comprehensive, which will allow for a clear national picture of the status of pavement and bridge conditions. In addition, this data would be available to the public and would be used to communicate a national performance story. The FHWA is developing a public Web site to share performance related information. In addition, the rule will help focus the Federal-aid highway program on achieving balanced performance outcomes.

The FHWA used a break-even analysis as the primary approach to quantify benefits. For both pavements and bridges, FHWA focused its analysis on vehicle operating costs (VOC) savings. The FHWA estimated the number of road miles of deficient pavement that will have to be improved (Table 5, Section VII, Rulemaking Analysis and Notices) and the number

of posted bridges that will have to be avoided (Table 6, Section VII, Rulemaking Analysis and Notices) in order for the benefits of the rule to justify the costs. The results of the break-even analysis quantified the dollar value of the benefits that the rule must generate to outweigh the threshold value, the estimated cost of the rule, which is \$156.0 million in undiscounted dollars. The results show that the rule must result in the net improvement of approximately 71 miles of pavement (*i.e.*, from Poor condition) from its current base case projection, and three 1-year-long bridge postings will need to be avoided over 10 years, to generate enough benefits to outweigh the cost of the rule. The FHWA believes that the benefits of this rule will surpass this threshold. Therefore, the benefits of the rule are anticipated to outweigh the costs.

Relative to the proposed rule, the threshold for the pavement break-even analysis decreased in the final rule. Specifically, the number of NHS miles in Poor condition needing improvement to Fair condition decreased from 435 to 71 in the final rule. The break-even point was affected by an adjustment to the weighted average incremental cost per VMT related to maintenance and repair particularly by updating the VMT vehicle class weights, a decrease in the undiscounted 10-year cost of the pavement rule, an increase in the total VMT that are in poor, and an increase in the number of NHS miles estimated to be in poor condition based on more recent performance data.

The threshold for the bridge break-even analysis increased in the final rule relative to the proposed rule. Specifically, the number of year-long bridge postings that need to be reduced increased from two to three in the final rule. The break-even point increased due to the following updates to input data:

- The average detour for bridges posted with weight limits of at least 40 percent below the legal load decreased from 20 miles to 10.45 miles, and
- The percentage of trucks of total average annual daily traffic on posted bridges decreased from 12.6 percent to 9.7 percent.

The below table displays the Office of Management and Budget (OMB) A-4 Accounting Statement as a summary of the cost and benefits calculated for this rule.

<sup>5</sup> See Table 4 in Section VII, Rulemaking Analysis and Notices.

<sup>6</sup> Bureau of Labor Statistics Employee Cost Index, 2014.



OMB A-4—ACCOUNTING STATEMENT

Category	Estimates			Units			Source/citation
	Primary	Low	High	Year dollar	Discount rate (percent)	Period covered	
Benefits:							
Annualized Monetized (\$ millions/year) .....	None .....	None .....	None .....	NA .....	7 .....	NA .....	Not Quantified.
Annualized Quantified .....	None .....	None .....	None .....	NA .....	3 .....	NA .....	Not Quantified.
	None .....	None .....	None .....	NA .....	7 .....	NA .....	
Qualitative .....	With regard to the pavement condition measures, the rule is cost-beneficial if it results in the net improvement of approximately 71 miles of pavement (i.e., from poor condition to good) per year, or 710 miles over 10 years, from its current base case projection. With regard to the bridge condition measures, 0.3 year-long bridge postings will need to be avoided per year, or 3 year-long bridge postings over 10 years, in order for benefits to justify costs. Because of these low thresholds, FHWA determines that the rule benefits outweigh the costs.						Final Rule RIA.
Costs:							
Annualized Monetized (\$/year) .....	\$17,100,924	.....	.....	2014 .....	7 .....	10 Years .....	Final Rule RIA.
Annualized Quantified .....	\$16,232,012	.....	.....	2014 .....	3 .....	10 Years .....	Final Rule RIA.
	None .....	None .....	None .....	2014 .....	7 .....	10 Years .....	
Qualitative							
Transfers .....	None						
From/To .....	From:			To:			
Effects:							
State, Local, and/or Tribal Government .....	\$17,026,477	.....	.....	2014 .....	7 .....	10 Years .....	Final Rule RIA.
	\$16,161,365	.....	.....	2014 .....	3 .....	10 Years .....	
Small Business .....	Not expected to have a significant impact on a substantial number of small entities.			NA .....	NA .....	NA .....	Final Rule RIA.

II. Acronyms and Abbreviations

Acronym or abbreviation	Term
AASHTO .....	American Association of State Highway and Transportation Officials.
AC .....	Asphalt-Concrete.
ACPA .....	American Concrete Pavement Association.
ADA .....	Americans with Disabilities Act.
Alaska DOT&PF .....	Alaska Department of Transportation and Public Facilities.
AMPO .....	Association of Metropolitan Planning Organizations.
ASCE .....	American Society of Civil Engineers.
ASR .....	Alkali Silica Reactivity.
CDOT .....	Colorado Department of Transportation.
CIP .....	Capital Improvement Program.
CFR .....	Code of Federal Regulations.
CMAQ .....	Congestion Mitigation and Air Quality Improvement Program.
COMPASS .....	Community of Planners Association of Southwestern Idaho.
CRCP .....	Continuously Reinforced Concrete Pavements.
DOT .....	U.S. Department of Transportation.
State DOT .....	State Department of Transportation.
EIA .....	Energy Information Administration.
EO .....	Executive Order.
FHWA .....	Federal Highway Administration.
FAST Act .....	Fixing America's Surface Transportation Act.
FTA .....	Federal Transit Administration.
HPMS .....	Highway Performance Monitoring System.
HSIP .....	Highway Safety Improvement Program.
HSP .....	Highway Safety Plan.
IRI .....	International Roughness Index.
LRP/LRTP .....	Long Range Plan/Long Range Transportation Plan.
MAP-21 .....	Moving Ahead for Progress in the 21st Century Act.
MARC .....	Mid-American Regional Council.
MEPDG .....	Mechanistic-Empirical Pavement Design Guide <sup>7</sup> .
MPH .....	Miles per hour.
MPO .....	Metropolitan Planning Organization.
MTC .....	Metropolitan Transportation Commission.

Acronym or abbreviation	Term
MTP .....	Metropolitan Transportation Plan.
NARA .....	National Archives and Records Administration.
NARC .....	National Association of Regional Councils.
NBI .....	National Bridge Inventory.
NBIS .....	National Bridge Inspection Standards.
NHPP .....	National Highway Performance Program.
NCHRP .....	National Cooperative Highway Research Program.
NHS .....	National Highway System.
NPRM .....	Notice of Proposed Rulemaking.
NYMTC .....	New York Metropolitan Transportation Council.
NYSAMPO .....	New York State Association of Metropolitan Planning Organizations.
OMB .....	Office of Management and Budget.
PCA .....	Portland Cement Association.
PCCP or Jointed PCCP .....	Portland Cement Concrete Pavements.
PCI .....	Pavement Condition Index.
PRA .....	Paperwork Reduction Act.
PSR .....	Present Serviceability Rating.
PSRC .....	Puget Sound Regional Council.
RIA .....	Regulatory Impact Analysis.
RIN .....	Regulatory Identification Number.
ROW .....	Right of Way.
RSL .....	Remaining Service Life.
Secretary .....	Secretary of the U.S. Department of Transportation.
SHSP .....	Strategic Highway Safety Plan.
SME .....	Subject Matter Expert.
TEMPO .....	Association of Texas Metropolitan Planning Organizations.
TMA .....	Transportation Management Area.
TAMP .....	Transportation Asset Management Plan.
UMRA .....	Unfunded Mandates Reform Act of 1995.
U.S.C. ....	United States Code.
VMT .....	Vehicle Miles Traveled.
VOC .....	Vehicle Operating Costs.

<sup>7</sup> <http://onlinepubs.trb.org/onlinepubs/archive/mepdg/home.htm>.

### III. Background

The DOT's proposal regarding MAP-21's performance requirements is being presented through several rulemakings, some of which were referenced in the above discussions. As a summary, these rulemaking actions are listed below and should be referenced for a complete picture of performance management implementation. The summary below describes the main provisions that DOT plans to propose for each rulemaking.

On January 5, 2015, FHWA published an NPRM (80 FR 326) proposing the following: (1) The definition of national measures for the condition of NHS pavements and bridges; (2) the process to be used by State DOTs and MPOs to establish their pavement and bridge condition related performance targets that reflect the measures proposed in the NPRM; (3) the process State DOTs must follow to report on progress toward meeting or making significant progress toward meeting pavement and bridge condition related performance targets; (4) a methodology to be used to assess State DOTs' compliance with the target achievement provision specified under 23 U.S.C. 148(i); and (5) the minimum levels for the condition of pavement on the Interstate System and bridges carrying the NHS which

includes on- and off-ramps connected to the NHS.

On March 15, 2016, FHWA published a final rule (81 FR 13882) covering the safety-related elements of the Federal-aid Highway Performance Measures Rulemaking that included the following: (1) The definitions that are applicable to the new 23 CFR part 490; (2) the process to be used by State DOTs and MPOs to establish their safety-related performance targets that reflect the safety measures; (3) a methodology to be used to assess State DOTs' compliance with the target achievement provision specified under 23 U.S.C. 148(i); and (4) the process State DOTs must follow to report on progress toward meeting or making significant progress toward meeting safety-related performance targets. The final rule also included a discussion of the collective rulemaking actions FHWA intends to take to implement MAP-21 and FAST Act performance related provisions.

The FHWA published a third Federal-aid Highway Performance Measures Rulemaking (Regulatory Identification Number (RIN) 2125-AF54) on April 22, 2016, FR Vol. 81, No. 78. In this NPRM, FHWA proposed national measures for the remaining areas under 23 U.S.C. 150(c) that were not discussed under the first and second measure rules. The

third rulemaking effort includes the following measure areas: (1) National Management Performance Measures for Performance of the Interstate System and non-Interstate NHS; (2) Freight Movement on the Interstate System and the Congestion Mitigation and Air Quality Improvement Program (CMAQ) Traffic Congestion; (3) CMAQ On-Road Mobile Source Emissions; (4) the State DOT and MPO target establishment requirements for the Federal-aid highway program; and (5) performance progress reporting requirements and timing.

When FHWA began implementation of MAP-21, the three related Federal-aid highway performance measure rules were to be published at the same time to allow for a single, common effective date for all three rules. While FHWA recognizes that one common effective date could be easier for State DOTs and MPOs to implement, the process to develop and implement all of the Federal-aid highway performance measures required in MAP-21 has been lengthy. In light of this, instead of waiting for all three rules to be final before implementing the MAP-21 performance measure requirements, each of three Federal-aid highway performance measures rules will have individual effective dates. This would

allow FHWA, State DOTs, and MPOs to begin implementing some of the performance requirements much sooner than waiting for the rulemaking process to be complete for all three rules. The FHWA also believes that a staggered approach to implementation (*i.e.*, implementing one set of requirements at the onset and adding on requirements over time) will better help State DOTs and MPOs transition to a performance based framework. The FHWA expects that even though the effective date for each rule would occur as that rule is finalized, the second rule would ultimately be aligned with the third rule through a common performance period and reporting requirements for the proposed measures. A timeline for Biennial Performance Reports is shown in Figure 1 in section 490.105(e)(1).

Although FHWA believes that individual implementation dates will help State DOTs and MPOs transition to performance based planning, to lessen any potential burden of staggered effective dates, FHWA will provide guidance to State DOTs and MPOs on how to carry out the new performance requirements.

In addition to providing this guidance, FHWA is committed to providing stewardship to State DOTs and MPOs to assist them as they take steps to manage and improve the performance of the highway system. As a Federal agency, FHWA is in a unique position to use resources at a national level to capture and share strategies that can improve performance. The FHWA will continue to dedicate resources at the national level to provide technical assistance, technical tools, and guidance to State DOTs and MPOs to assist them in making more effective investment decisions. It is FHWA's intent to be engaged at a local and national level to provide resources and assistance from the onset to identify opportunities to improve performance and to increase the chances for full State DOT and MPO compliance of new performance related regulations. The FHWA technical assistance activities include conducting national research studies, improving analytical modeling tools, identifying and promoting best practices, preparing guidance materials, and developing data quality assurance tools.

#### **IV. Summary of the Notice of Proposed Rulemaking**

The NPRM published on January 5, 2015 (80 FR 326), was one of several NPRMs that FHWA issued to implement sec. 1203 of MAP-21, which establishes performance management as a way to transform the Federal-aid highway program and refocus it on national

transportation goals, increase accountability and transparency of the program. The NPRM proposed a set of national measures for State DOTs to use to assess the condition of pavement and bridges on the NHS in support of MAP-21's national goal of maintaining the condition of highway infrastructure assets in a state of good repair.

After a period of engagement and outreach with State DOTs, MPOs, and other stakeholders and a review of nationally recognized reports, FHWA's NPRM proposed six national performance measures that rated the percentage of all mainline pavements on the NHS (excluding the Interstate System), bridges carrying the NHS which includes on- and off-ramps connected to the NHS, and mainline pavements on the Interstate System in either Good or Poor condition. The ratings proposed in the NPRM were derived from several quantitative metrics that addressed physical characteristics of pavement and bridge condition and were tracked and reported regularly to FHWA by State DOTs in the HPMS and the NBI. The NPRM also proposed a minimum level of condition for pavements on the Interstate System as required by the statute. The NPRM also incorporated the minimum condition level for NHS bridges, as stated in 23 U.S.C. 119(f)(2). To support the new measures, the NPRM proposed to establish standardized data requirements that prescribed State DOTs' pavement and bridge condition data gathering practices. These requirements specified the data elements State DOTs must collect, methods for collecting those data elements, and the spatial and temporal coverage of the data they collect. The NPRM's proposed data requirements ensured more accurate calculation of the proposed national pavement and bridge performance measures based on State DOTs' data.

The NPRM also proposed to establish the processes for State DOTs and MPOs to establish and report progress toward achieving targets, and the process for FHWA to determine whether State DOTs have made significant progress in achieving targets.

The measures, data requirements, and related processes included in the NPRM were selected by FHWA after careful determination that they represented the best choices for achieving greater consistency among State DOTs in compiling accurate infrastructure condition information, following processes for target setting, and reviewing progress toward targets. In turn, FHWA expected the measures to enhance accountability and support a

strong national focus on the condition of the Nation's highways, while minimizing the number of measures needed and maintaining reasonable flexibility for State DOTs as they manage risk, differing priorities, and fiscal constraints. Lastly, FHWA anticipated that the proposed measures could be implemented in the timeframe required under MAP-21, without introducing a considerable burden on State DOTs.

#### *Pavement Condition Measures*

The four pavement condition measures proposed in the NPRM were: (1) Percentage of pavements on the Interstate System in Good condition; (2) Percentage of pavements on the Interstate System in Poor condition; (3) Percentage of pavements on the NHS (excluding the Interstate System) in Good condition; and (4) Percentage of pavements on the NHS (excluding the Interstate System) in Poor condition.

#### *Pavement Data Requirements and Metrics*

Under the NPRM, performance ratings of Good, Fair, or Poor condition for pavement were determined by FHWA using a combination of several metrics derived from data elements collected by State DOTs and reported to the HPMS. These metrics collectively provided a way to quantify pavement condition in terms of roughness and cracking for all pavement types, rutting for asphalt pavement surfaces, and faulting (misalignment between concrete slabs) for jointed concrete pavement surfaces. Roughness affects users' travel speeds, safety, comfort, and transportation costs. Cracking, rutting, and faulting are considered surface indicators of structural deterioration in different pavement types. Since 2010, most State DOTs have reported roughness, cracking, rutting, and faulting data annually to FHWA through HPMS.

The NPRM specified that data for the roughness, cracking, rutting, and faulting metrics must be collected consistent with practices outlined in the HPMS Field Manual (A draft of the updated HPMS Field Manual was placed on the docket with the NPRM at FHWA-2013-0053).

#### *Calculation of Pavement Measures*

The proposed pavement measures were designed to reflect a pavement's predominant condition, represented by roughness, cracking, rutting, and faulting data elements, as applicable. For a section of pavement to be rated in Good condition, the absolute values for all relevant metrics need to exceed thresholds specified in the NPRM.



Conversely, a section of asphalt or jointed concrete pavement would be rated in Poor condition if any two of three relevant metrics were below specified threshold values. A section of Continuously Reinforced Concrete Pavement would be rated in Poor condition if the two relevant metrics are below the specified threshold values. The FHWA explained that a measurement approach that focused only on increasing Good conditions or reducing Poor conditions may result in practices that would not optimize the benefits of infrastructure investments.

#### *Bridge Condition Measures*

The two bridge condition measures proposed in the NPRM were: (1) Percentage of NHS bridge deck area classified as in Good condition and (2) Percentage of NHS bridge deck area classified as in Poor condition.

#### *Bridge Data Requirements and Metrics*

Under the NPRM, performance ratings of Good or Poor condition for bridges were determined by FHWA using a combination of several metrics collected by each Federal agency, State DOT, and tribal government as part of their NBI submittals (specifically deck, superstructure, substructure, and culverts). These metrics provide an overall characterization of the general physical condition of the entire bridge component being rated. The NBI database was established in 1972 and State DOTs have been required to submit annual NBI reports to FHWA since 1978. The NBI is a highly consistent set of national data for evaluating and monitoring the condition and performance of bridges that is based on National Bridge Inspection Standards (NBIS) for the proper and uniform inspection and evaluation of highway bridges. The NPRM further proposed to weight the classifications by the respective deck area of the bridge and express condition totals as a percentage of the total bridge deck area on the NHS in a State.

#### *Calculation of Bridge Measures*

The NPRM's proposed bridge measures reflected the lowest component condition rating for the bridge, based on the NBI condition ratings for deck, superstructure, substructure, and culverts. For a bridge to be classified as in Good condition, all the relevant metrics need to equal the values specified in the NPRM. Similarly, a bridge would be classified as in Poor condition if any of the relevant metrics equal the values specified in the NPRM.

#### *State Departments of Transportation and Metropolitan Planning Organizations Pavement and Bridge Performance Targets*

The NPRM described a process by which the six pavement and bridge condition performance measures would be used by State DOTs and MPOs to establish quantifiable statewide performance targets to be achieved over a 4-year performance period, with the first performance period starting in 2016. Under the NPRM, a State DOT or MPO could consider a number of factors (e.g., funding availability and local transportation priorities) that could impact the targets they ultimately establish for pavement and bridge system conditions. According to the NPRM, State DOTs would establish 2- and 4-year targets for the six pavement and bridge condition measures 1 year after the effective date of the rule. The MPOs would establish targets by either supporting the State DOT's statewide target, or defining a target unique to the metropolitan planning area each time the State DOT establishes a target. In accordance with MAP-21, the NPRM provided MPOs a 180-day period following the date at which the State DOT established their pavement and bridge targets. Furthermore, the NPRM proposed a minimum level of condition for Interstate System pavements of no more than 5 percent of pavement lane miles in Poor condition, and reiterated the MAP-21 requirement of no more than 10 percent of the deck area of bridges on the NHS classified as structurally deficient.

#### *State Departments of Transportation and Metropolitan Planning Organization Pavement and Bridge Performance Reporting*

The NPRM proposed that State DOTs submit biennial reports to FHWA on the condition and performance of the NHS. Under the NPRM, State DOTs submitted their targets in a baseline report at the beginning of each performance period and reported progress in achieving targets at the midpoint and end of the performance period. State DOTs were allowed to adjust their 4-year target at the midpoint of the performance period. The MPOs were not required to provide separate reporting to FHWA. However, State DOTs and MPOs needed to agree on a reporting process in the Metropolitan Planning Agreement.

#### *Determination of Significant Progress*

The NPRM proposed the method for FHWA to determine if State DOTs achieved significant progress toward their target from an analysis of

estimated condition/performance and measured condition/performance of each of the targets. If applicable, State DOTs could have the opportunity to discuss why targets were not achieved or significant progress was not made. If a State DOT failed to achieve significant progress in two consecutive biennial determinations, then the State DOT was required to document in their next biennial performance report, and encouraged to document sooner, the actions they would undertake to achieve their targets.

#### **V. Discussion of Comments**

The FHWA received 127 public comment submissions to the docket. This included letters from 42 State DOTs, 13 MPOs, 19 counties or local government agencies, 16 industry associations, and several other submissions from individuals, advocacy organizations, and private industry members. One submission contained over 1,000 duplicates of a letter expressing support for the rule and appreciation to FHWA for responding to public comment on the first performance management NPRM related to safety. The comment submissions covered a number of topics in the proposed rule, with the most substantive comments on establishment of targets, reporting, the significant progress determination process, pavement condition performance measures, and bridge condition performance measures.

Of the 127 public comment submissions received, the majority expressed overall support for the rule. Commenters expressed general concerns over NHS ownership, the performance period timespan, the start of the reporting cycle, target adjustment, significant progress determination and timing, incorporation by reference, and minimum condition penalties. For pavement condition measures specifically, commenters had mixed opinions regarding the use of the IRI and other metrics and expressed concern over the proposed extent of data collection, the treatment of missing data, and the proposed minimum condition level. For bridge condition measures specifically, commenters expressed mixed opinions about the use of element level data and expressed opposition to the proposed definition of structurally deficient.

The FHWA thanks all commenters for their responses to the NPRM. The FHWA carefully considered the comments received from the stakeholders.

### *Selected Topics for Which FHWA Requested Comments*

In the NPRM, FHWA requested comments on different topics related to the rulemaking. Several of those had an impact on the final rule and are discussed in this section. The others are discussed in the section-by-section analysis.

### *Purpose and Approach of the Regulatory Action*

The FHWA received general support of the performance management concept and its proposed implementation from State DOTs, industry groups, and private citizens.<sup>8</sup> The FHWA also received several comments that opposed specific portions of the proposed rule from State DOTs, industry, local governments, and advocacy groups.<sup>9</sup> Some of these same commenters shared their overall support of the rule.

A number of State DOTs and MPOs took issue with the assumptions and levels of cost analysis associated with the requirements of the NPRM reflected in the benefit-cost analysis and suggested that it be reconsidered.<sup>10</sup> These comments are discussed in more detail in Section VI. In terms of benefits, Fugro Roadware, a firm that manufactures and operates equipment that is used to measure the pavement conditions on State and municipal networks, asserted that the “entire pavement and traffic assessment management process has been shown to improve the quality of road networks without an overall increase of funding. . . .”

Finally, FHWA received numerous comments that fell outside of the scope

of the rulemaking. The American Motorcyclist Association, for example, endorsed the design standards that advance the safety of motorcycle use. The advocacy group Perils for Pedestrians commented that more pedestrians are injured by falls than vehicles. The American Society of Civil Engineers (ASCE) requested FHWA incorporate Life Cycle Costs into performance management rules. Finally, private citizens (1) requested an addition to the proposed rule to promote small business during the inspection and accounting for each new project; (2) advocated for improved standards for design and construction of longitudinal joints in pavements; (3) endorsed the goals for Safety and Asset Management Rules as well as incentives to increase public transit; and “(4) suggested the rule require the use of compact joints on highways to extend the pavement’s lifetime.”

### *Public Comments in Response to FHWA’s Questions in the NPRM*

In the NPRM, FHWA requested comments on certain topics related to the pavement and bridge condition performance measures rulemaking. Comments received in response are summarized below.

### *Does the approach to performance measures support the nine implementation principles?*

The FHWA listed nine principles in the NPRM preamble that were considered in the development of the proposed regulation.<sup>11</sup> Overall,

<sup>11</sup> Nine principles used in the development of proposed regulations for national performance management measures under 23 U.S.C. 150(c), [www.regulations.gov](http://www.regulations.gov), Docket FHWA–2013–0053:

- i. Provide for a National Focus—focus the performance requirements on outcomes that can be reported at a national level.
- ii. Minimize the Number of Measures—identify only the most necessary measures that will be required for target establishment and progress reporting. Limit the number of measures to no more than two per area specified under 23 U.S.C. 150(c).
- iii. Ensure for Consistency—provide a sufficient level of consistency, nationally, in the establishment of measures, the process to set targets and report expectations, and the approach to assess progress so that transportation performance can be presented in a credible manner at a national level.
- iv. Phase in Requirements—allow for sufficient time to comply with new requirements and consider approaches to phase in new approaches to measuring, target establishment, and reporting performance.
- v. Increase Accountability and Transparency—consider an approach that will provide the public and decision makers a better understanding of Federal transportation investment needs and return on investments.
- vi. Consider Risk—recognize that risks in the target establishment process are inherent, and that performance can be impacted by many factors outside the control of the entity required to establish the targets.

commenters (AASHTO and the State DOTs of Alabama, Connecticut, Georgia, Maryland, New Jersey, New York State, Oregon, and Texas, and private entity Steve Mueller Consultancy) supported FHWA’s nine principle approach. However, the New York Metropolitan Transportation Council (NYMTC) felt the NPRM was inconsistent with the nine principles in relationship to linking financial penalties to the single nationwide [*sic*, statewide] targets for pavement and bridges causing inconsistency with the principles of: (1) Understand that Priorities Differ (“Single targets do not acknowledge regional differences in infrastructure age. . . .”), (2) Recognize Fiscal Constraints (“These targets and penalties have the effect of limiting flexibility we have for investing in assets across our systems at the state, regional, and local levels, as we deem appropriate.”), and (3) Provide for Flexibility (“Tying penalties to the specific measures in § 490.317 and § 490.413 and requiring [S]tates to focus spending on two specific components of the transportation system (Interstate pavement and NHS bridges) is the antithesis of flexibility.”) NYSDOT (New York State Department of Transportation) and other NYMTC members are responsible for the entire transportation system in the region, and all approach asset management from a system-level perspective (including both NHS and non-NHS assets). These thresholds and associated penalties could lead to an exclusive focus on Interstate pavement and NHS bridges at the expense of the remainder of the system.”

In addition, the Northeast Pavement Preservation Partnership (NEPPP) felt most of the principles were covered but that FHWA did not address the following principles: (1) Recognize Fiscal Constraints—“The proposed performance measures do not encourage optimal investment. It can be argued that they instead encourage worst-first mentality, since there is a target for percent poor, and since there are bins

vii. Understand that Priorities Differ—recognize that State DOTs and MPOs must establish targets across a wide range of performance areas, and that they will need to make performance trade-offs to establish priorities, which can be influenced by local and regional needs.

viii. Recognize Fiscal Constraints—provide for an approach that encourages the optimal investment of Federal funds to maximize performance but recognize that, when operating with scarce resources, performance cannot always be improved.

ix. Provide for Flexibility—recognize that the MAP–21 requirements are the first steps that will transform the Federal-aid highway program to a performance-based program and that State DOTs, MPOs, and other stakeholders will be learning a great deal as implementation occurs.

<sup>8</sup> The State DOTs of Alaska, Florida, Georgia, Illinois, Iowa, Louisiana, Maine, Minnesota, Missouri, New Hampshire, New York, Oregon, Vermont, Virginia, and Washington State; and AASHTO, Cemex USA, National Asphalt Pavement Association, National Association of Regional Councils, National Center for Pavement Preservation, New York Metropolitan Transportation Council, New York State Association of Metropolitan Planning Organizations, Northeast Pavement Preservation Partnership, Oversight Committee for the California Local Streets and Roads Needs Assessment, Southern California Association of Governments, Southeast Michigan Council of Governments, Southeast Pavement Preservation Partnership, and Transportation for America, Blake Rubenstein.

<sup>9</sup> State DOTs of Alaska, Idaho, New York, North Dakota, Oregon, South Dakota, Rhode Island, and Wyoming; the City of Santa Rosa, CA and the Seattle DOT; and Agile Assets, American Road and Transportation Builders Association, Center for American Progress, Michigan Transport Commission and Asset Management, and Transportation for America.

<sup>10</sup> Atlanta Regional Commission, Texas Association of Metropolitan Planning Organizations, Transportation for America, and State DOTs of Colorado, Rhode Island, North Carolina, Mississippi, Oklahoma, Michigan, Georgia, Louisiana, and Oregon.



(i.e., percent good, percent fair, and percent poor)). Optimal investment could much more readily be achieved with an overall Index or RSL approach, where pavement preservation is encouraged along with rehabilitation.”); and (2) Provide for Flexibility—(“It is not apparent in the rules how flexibility is provided for. No provision is made for allowing a [State] DOT to implement and manage toward different measures which may be more cost-effective.”). The National Asphalt Pavement Association (NAPA) made similar arguments in regard to principle (1) “Recognize Fiscal Constraints—(“NAPA is concerned that the proposed rule could lead to poor decisions (i.e., “worst first”) in order to comply with the NPRM minimum pavement condition, rather than decisions that factor in the long-term preservation and performance of pavements.”); and (2) Provide for Flexibility—(“Agencies should have flexibility to make decisions that balance preserving good/fair pavements with improving and rehabilitating poor pavements.”)

While the following commenters generally agreed that FHWA’s approach to performance measures was consistent with the nine principles, they also identified areas that were lacking. Georgia DOT stated that the approach in the proposed rule may not fully support the principle of recognizing fiscal constraints or provide for an approach that encourages the optimal investment of Federal funds to maximize performance.

The NYMTC and the Georgia and Maryland DOTs stated that limited funding could prevent targets and minimums from being achievable and that imposing the proposed penalties could result in worsening of other assets. Moreover, the NYMTC commented that with no long term funding solution for national or State transportation programs, States may not have a defensible way to establish targets or make changes to their investment strategies.

The NEPPP also commented that the proposed rule will not allow a State DOT to implement and manage their program toward different measures or metrics that encourage a balanced program based on asset management pavement preservation conceptions.

Several commenters cited concerns over flexibility in the rule tied to implementation principles. The NYS DOT commented that States should not be forced to use specific performance targets or measures. The New Jersey DOT raised concerns about reporting requirements, commenting that they will need to maintain “two sets of

books,” one for national performance reporting and one to manage their network, using appropriate pavement management and asset management principles.

*Suggestions for How FHWA Can Best Assist State DOTs and MPOs To Maximize Opportunities for Successful Implementation of the Proposed Performance Measures*

Generally, States expressed a desire for more training materials, technical assistance, and technical guidance so that they can implement the rule accurately and efficiently. Several commenters, including AASHTO and the State DOTs of Connecticut, Louisiana, New Jersey, and Oregon, expressed a desire for additional technical assistance and guidance detailing the process FHWA will use to compute the overall pavement condition measures. Commenters also requested guidance on target setting best practices for State DOTs and MPOs. The Maryland DOT suggested that FHWA provide a contact person or Web link for technical assistance activities. In addition, the Alabama DOT commented that more guidance be given on data quality. They argued that the training materials have lacked information in statistical methodology and note, “it is simple to determine if a dataset is reasonable; it is quite a different matter to determine if the dataset is correct.”

*Should the measures reflect additional factors such as facility location, functional class, level of use, environment, or impact it may have on other aspects of transportation performance?*

The American Concrete Pavement Association (ACPA) and Portland Cement Association (PCA) requested that FHWA modify the proposed rule to provide a better assessment of the performance of our highways and bridges. A private citizen, Joyce Dillard, commented that the measures should reflect level of use, environment, and overweight trucks. Acknowledging that there is limited funding and increasing needs, Oregon DOT commented that adding additional factors could help show progress. The commenter suggested adding measures such as functional class, progress made on other deficiencies (e.g., painting, vertical clearance, and rail), and risk. Additionally, for bridges specifically, the commenter suggested looking at mitigation measures to reduce vulnerability to seismic activity and scour. In addition, the New York City DOT recommended that traffic counts on bridges could be a useful measure to

collect. The commenter noted that that traffic counts are an important variable that quantifies a bridge’s performance and life expectancy.

*Appropriateness of the Proposed Threshold Criteria To Determine Good, Fair, and Poor Ratings*

• *Concerns with Pavements:*

Commenters stated that agencies will be driven to overemphasize treatments that lower cracking and improve ride quality on pavements that currently rank as Poor at the cost of solutions that extend the performance life of the pavements that currently rank as Good or Fair (e.g., surface treatments). In addition, commenters noted that although pavement types referenced in the NPRM (Portland Cement Concrete Pavements and Continuously Reinforced Concrete Pavements (CRCP)) make up the vast majority of the NHS, other pavement surfaces exist in small quantities.

*Should FHWA establish a minimum condition threshold that would become more stringent over time?*

Commenters provided mixed opinions on the establishment of a minimum condition threshold that would become more stringent over time. Several commenters expressed concern that pressure to meet a difficult minimum condition threshold may push States to implement a worst-first approach to pavement preservation, which would run counter to the asset management principles and planning approach advocated by FHWA.<sup>12</sup> The Oregon DOT commented that a problem with pavement performance measures is that they “discourage proven, cost effective, pavement preservation techniques.” Agencies that are under pressure to meet performance targets may implement a worst-first approach.

Other State DOTs and AASHTO recommended FHWA evaluate the effects of the national level performance measures, targets and minimum condition levels to ensure that these policies have a positive impact on management approaches.

<sup>12</sup> State DOTs of Arkansas and Mississippi, the Southern California Association of Governments, the Seattle Department of Transportation.



## VI. Section-by-Section Discussion of the General Information and National Performance Management Measures for the National Highway Performance Program: Pavement and Bridge

### A. Subpart A—General Information

#### Discussion of Section 490.101 General Definitions

In the NPRM, FHWA proposed several definitions to be used in this regulation.

Only Washington State DOT commented on the definition for the term “HPMS” and they agreed with the definition. The FHWA retains the definition for HPMS.

In the NPRM, the term “full extent” was defined as “continuous collection and evaluation of pavement condition data over the entire length of the roadway.” The term “mainline highways” was defined as “the through travel lanes of any highway exclude ramps, shoulders, turn lanes, crossovers, rest areas, and other pavement surfaces that are not part of the roadway normally travelled by through traffic.”

Only Washington State DOT commented on the definition for “full extent” and they agreed with the definition. The State DOTs of Connecticut, Maine, New Hampshire, Vermont, and Washington State and AASHTO agreed with the definition of “mainline highways.” However, Colorado DOT stated that the definition conflicts with section 490.309(c)(1)(i) requiring data for the full extent of the mainline highway of the NHS which would indicate that State DOTs need to collect data on all through travel lanes. The Colorado DOT added that the intent is that States collect one lane’s worth of data on NHS. The FHWA described in the NPRM that section 490.309(c) applies to Through Lanes, Surface Type, and Structure Type Data Items, while section 490.309(b) requires that State DOTs report IRI, rutting, faulting, and Cracking Percent only apply to the rightmost travel lane or one consistent lane, if the rightmost travel lane is not accessible. Based on this, FHWA believes that the definitions of “mainline highways” and “full extent” do not conflict with other sections in this rule. The FHWA retains those definitions in the final rule.

The Washington State DOT agreed with the definitions for “metric” and “measure,” and Mid-America Regional Council appreciated the distinction between the two terms. The FHWA retains the definitions for “metric” and “measure.”

The Puget Sound Regional Council (PSRC) urged FHWA to consider

allowing MPOs to establish performance targets that “encompass all areas within their planning boundary rather than only the Federally designated metropolitan planning area.” They added that this definition of area would allow for consistent infrastructure condition targets for the full region in the event the MPO target differs from the State target. To eliminate the ambiguity with the term “metropolitan planning area,” FHWA includes the definition for “metropolitan planning area” in this regulation as the term defined in the Statewide and Nonmetropolitan and Metropolitan Transportation Planning Regulations at 23 CFR 450.104. This term is used consistently as the extent of an MPO target that represents performance outcomes of the transportation network within the area. So the definition has been included to ensure consistency in interpretation by readers.

In the NPRM, the term “non-urbanized area” was defined as “any geographic area that is not an ‘urbanized area’ under either 23 U.S.C. 101(a)(34).” The FHWA received comments from Washington State and Virginia DOTs on the definition for “non-urbanized area.” The Washington State DOT supported the proposed definition. The Virginia State DOT pointed out that the proposed definition is missing a citation because only one citation (23 U.S.C. 101(a)(34)) was provided after the word “either.” The FHWA appreciates the comments from both agencies and examined the definition for better clarification while maintaining consistency with section 490.105(e)(3)(ii), which specifies a single collective non-urbanized area target and is consistent with the language in the final rule for safety performance measures. The FHWA also recognizes the word “either” was inadvertently included in the proposed definition. As a result, FHWA revised the definition for “non-urbanized area” to clearly indicate that a non-urbanized area is a single, collective area comprising all of the areas in the State that are not “urbanized areas” defined under 23 U.S.C. 101(a)(34).

Only Washington State DOT commented on the definition for the term “performance period,” agreeing with the proposed definition. The FHWA retains the definition for “performance period.”

The Washington State DOT agreed with the definition for “target.” The Minnesota DOT recommended the term “plan outcome” as opposed to “target” because they said that Minnesota DOT uses the term “target” to identify an aspirational performance objective to define investment need, as opposed to

an objective that they expect to achieve within the constraints of the resources currently available.” The FHWA appreciates Minnesota DOT’s suggestion on the term. However, FHWA retains the term “target” in the final rule because the term is referenced in the statute (23 U.S.C. 150(d), 134(h), 135(d), and 119(e)).

As discussed in section 490.309 (Using Structure Type to Identify and Exclude Bridges) and section 490.405, FHWA moves the definition of “bridge” from subpart D (*i.e.*, section 490.405) to this section in subpart A to use the term in a consistent manner throughout this rule. The FHWA strikes the term “this section” in the definition of “bridge” and replaces with the term “this Part” to ensure that the definition of “bridge” in this section applies to both subparts in the final rule. Therefore, the definition of “bridge” in the final rule is: “Bridge, as used in this Part, is defined in § 650.305 of this title, the National Bridge Inspection Standards.” Please see discussion sections for sections 490.309 and 490.405 for more detail.

Finally, FHWA retains the definitions for “National Bridge Inventory” as proposed in the NPRM. There were no substantive comments regarding the definition.

#### Discussion of Section 490.103 Data Requirements

The FHWA proposed in section 490.103 of the NPRM, the data requirements that apply to more than one subpart in part 490. Additional proposed data requirements that are unique to each subpart are included and discussed in their respective subpart.

Some comments from AASHTO and the State DOTs of Alaska and Connecticut referenced section 490.103 in their respective letters, but their comments were on the incorporation by reference of the HPMS Field Manual and NBI Coding Guide. Please refer to the discussion on section 490.111 on incorporation by reference for response and discussion.

There were no direct comments on section 490.103(a). However, FHWA did correct the referenced subparts in section 490.103(a) by changing “B and C” to “C and D” so that the regulatory text correctly refers to the subparts in the final rule.

In section 490.103(b), FHWA proposed that State DOTs submit urbanized area boundaries reported to HPMS in the year the Baseline Performance Period Report is due. Section 490.105(d)(3) specifies that the urbanized boundaries used in the Baseline Performance Period Report are

applicable for the entire performance period, regardless of whether FHWA approves adjustments to the urbanized area boundary during the performance period. This provision was proposed because the urbanized area boundaries and resulting non-urbanized area boundary have the potential to change on varying schedules; and changing a boundary during a performance period may lead to changes in the measures reported for the area, which could impact how an established target relates to actual measured performance. The FHWA also explained in the NPRM that State DOT submitted boundary information would be the authoritative data source for: (1) The target scope for the additional targets for urbanized and non-urbanized areas (section 490.105(e)(3)); (2) progress reporting (section 490.107(b)); and (3) IRI rating (section 490.313(b)(1)) for the pavement condition measures identified in section 490.105(c)(1) through (3).

The FHWA received four comments directly related to the urbanized area boundary. The Missouri State DOT supported that State DOT-submitted boundary information should be the authoritative data source for the target scope for the additional targets for urbanized and non-urbanized areas. The Oregon State DOT commented that keeping urbanized area constant for the performance measures' entire 4-year performance period is "too inflexible and may not reflect how investment decisions are actually made during the performance period due to changing route priorities." They added that the proposed approach "looks backward in the mirror, rather than forward which is needed to incorporate up to date planning and policy." The FHWA agrees with Oregon State DOT in that at the time of target establishment, agencies should be looking forward by incorporating up-to-date planning and policy decisions and anticipate future changes. Although planning and policy decisionmaking should be "forward-looking," for the purpose of assessing the impact of investment on condition/performance, FHWA believes preserving consistent boundaries throughout a performance period is essential to consistently assess target achievement during a performance period. The Texas State DOT and Texas Association of Metropolitan Planning Organizations commented that guidance is needed on where an urbanized area boundary will be set in relation to bridges. They stated that in some cases, the midpoint of the structure has been used as the boundary. There should be a determination regarding this issue in

relation to how these bridges are classified at urban/rural boundaries and, in the case of two adjacent MPO planning area boundaries, to which MPO area the structure is assigned. Considering these comments, FHWA plans to issue guidance on urbanized and non-urbanized target establishment, which will address issues related to bridge boundaries.

Because the threshold values for IRI metric no longer depend on the location (*i.e.*, urbanized area with a population greater than 1 million) of pavement sections which is discussed in section 490.313(b)(1), FHWA revises sections 490.103(b) and 490.107(b)(1)(ii)(D) to remove the term "IRI rating determination."

Section 490.103(c) is reserved.

No direct comment was received for section 490.103(d), and FHWA retains the language as proposed in the NPRM. Please see revised section 490.105(d)(3) for discussion on NHS limits and refer to the section 490.111 discussion section on the incorporation by reference.

#### Discussion of Section 490.105 Establishment of Performance Targets

In section 490.105 of the NPRM, FHWA proposed the minimum requirements that would be followed by State DOTs and MPOs in the establishment of targets for all measures identified in section 490.105(c). These requirements were proposed to implement the 23 U.S.C. 150(d) and 23 U.S.C. 134(h)(2) target establishment provisions in a manner that provides for the consistency necessary to evaluate and report progress at a State, MPO, and national level, while also providing a degree of flexibility for State DOTs and MPOs.

A couple of general comments on section 490.105 were received by FHWA. The Oregon State DOT expressed their appreciation for the proposed rule allowing State DOTs to establish performance targets "without the unnecessary burden of an FHWA target approval process." However, the Virginia State DOT commented that the proposed rule is "unclear on what may occur if FHWA disagrees with a State's proposed performance target and/or a State's strategy to meet that performance target." They added that the "rule does not indicate what actions FHWA may take in such a situation, the rule as proposed sets up a possible point of future conflict between States and FHWA on how the State manages its resources in order to effectively manage its highway infrastructure to meet traffic demands and assure public safety." However, the Virginia State DOT noted

that they are in favor of the proposal's approach to States establishing targets. In response to the comment from Virginia State DOT, FHWA notes that there is no language in the NPRM or this rule related to FHWA's approval or rejection of established targets by State DOTs and MPOs because the statutory language in MAP-21 provides that State DOTs and MPOs have the ability to establish their own targets and MAP-21 does not provide FHWA the authority to approve or reject State DOT or MPO established targets. In the discussion for section 409.109 in the NPRM, FHWA stated that "State DOTs would, through a transparent and public process, want to establish or adjust targets that strive to improve the overall performance of the Interstate and National Highway systems." The North Carolina State DOT requested clarification of the meaning of "transparent and public" in regard to the target establishment process. They asked if FHWA considered that State DOTs are already required to hold public hearings when they select projects for the Statewide Transportation Improvement Program (STIP), and if this would satisfy the target establishment requirement. The FHWA does not prescribe specific methods for making the target establishment process transparent and public. Please refer to the final Planning Rule<sup>13</sup> for performance requirements for the statewide transportation plan and STIP, including any requirements to include targets in the planning documents and the methods for developing those documents.

The Center for American Progress stated that MAP-21 established that a clear goal of Federal policy is to "maintain the highway infrastructure asset system in a state of good repair." They added that "Congress did not intend for States to set their performance goals to include assets being in worse condition in the future than they currently are." A letter from Steve Mueller Consultancy stated it would be "wrong to accept declining conditions on our roads of national importance." They added that State DOTs and MPOs should reprioritize their expenditure plans to change because the declining condition is "unacceptable."

However, comments from AASHTO, Association of Metropolitan Planning Organizations (AMPO), Metropolitan Transportation Commission, Mid-America Regional Council, New York

<sup>13</sup> Final Rule on Statewide and Nonmetropolitan Transportation Planning; Metropolitan Transportation Planning (Regulatory Identification Number (RIN) 2125-AF52) on May 27, 2016, FR Vol. 81, No. 103.



Metropolitan Transportation Council, city of Seattle Department of Transportation, an anonymous citizen, and the State DOTs of Alaska, Arkansas, California, Connecticut, Florida, Idaho, Iowa, Maine, Minnesota, Mississippi, Missouri, Montana, New Hampshire, New York, North Dakota, Oregon, Pennsylvania, South Dakota, Vermont, Washington State, and Wyoming stated that State DOTs and MPOs should have the flexibility to establish targets, including targets that have condition/performance holding steady or, in some situations, declining. They added that targets indicating declined condition/performance are discussed in the preamble of the NPRM but not in the proposed rule itself. These commenters recommended that specific language be included in the rule.

The FHWA believes that State DOTs and MPOs have the authority to establish their targets at their discretion. Moreover, as stated previously in this section, MAP-21 does not provide FHWA the authority to approve or reject State DOT or MPO established targets. The FHWA believes that this rule does not hinder the ability of State DOTs and MPOs to establish targets that have performance holding steady or, declining targets. Thus, FHWA believes that specific language describing potential target level scenarios in the regulatory language is unnecessary. Therefore, FHWA retains the language in section 490.105(a). The FHWA did add “of this section” to the paragraph to meet the publication requirements of the **Federal Register**, and improve the clarity and consistency of the text. This addition did not change the intent of the original text in the NPRM.

In section 490.105(b), FHWA proposed in the NPRM that State DOTs and MPOs shall establish performance targets for the HSIP measures in accordance with section 490.209. The Alaska Department of Transportation and Public Facilities (Alaska DOT&PF) recommended that this paragraph should be removed because section 490.209 is not part of this rulemaking. The FHWA disagrees with the comment because FHWA felt this paragraph is necessary to point out target establishment requirements related to the HSIP measures that are different from this subpart. Therefore, FHWA retains the language in section 490.105(b).

The FHWA did not receive any substantive comments regarding section 490.105(c), therefore, FHWA made no changes.

#### Discussion of Section 490.105(d) Ownership

Section 490.105(d) specifies that the targets established by State DOTs and MPOs shall, regardless of ownership, represent the transportation network or geographic area, including bridges that cross State borders, that are applicable to the pavement and bridge condition measures. Title 23 U.S.C. 150(c)(3) requires the establishment of measures for State DOTs to use to assess the condition of pavements on the Interstate System, the condition of pavements on the NHS (excluding the Interstate), and the condition of bridges carrying the NHS which includes on- and off-ramps connected to the NHS for the purpose of carrying out the NHPP. Additionally, 23 U.S.C. 150(d) requires State DOTs to establish performance targets that reflect the established measures. Furthermore, 23 U.S.C. 119(e)(7) specifies State requirements when it does not achieve or make significant progress toward achieving the established performance measures targets for the NHS.

To implement the statutory provisions of 23 U.S.C. 150(c)(3), FHWA proposed that the pavement condition measures in subpart C are applicable to the mainline highways on the Interstate System and on the non-Interstate NHS and the bridge condition measures in subpart D are applicable to bridges carrying the NHS which includes on- and off-ramps connected to the NHS (sections 490.307 and 490.403). To ensure that the performance targets required under 23 U.S.C. 150(d) are applicable to the same extent to highways and bridges as the performance measures in sections 490.307 and 490.403, FHWA included the phrase “regardless of ownership,” in section 490.105(d).

To implement the requirements of 23 U.S.C. 119(e)(7), section 490.109(e) provides that FHWA would determine whether or not a State DOT achieved or made significant progress toward achieving the State DOT targets, consistent with the target scope described in section 490.105(d), for the NHS NHPP targets. In the NPRM, FHWA recognized the limit of the direct impact State DOTs and MPOs can have on the performance outcomes within the State and the metropolitan planning area, respectively, and that State DOTs and MPOs need to consider this uncertainty when establishing targets. The FHWA further stated that some Federal and tribal lands contain roads and bridges carrying the NHS, which includes on- and off-ramps connected to the NHS that State DOTs would need to consider (as appropriate) when

establishing targets. Finally, FHWA expressed a need for State DOTs and MPOs to consult with relevant entities (e.g., Federal Land Management agencies, State DOTs, MPOs, local transportation agencies, and tribal governments) as they establish targets to better identify and consider factors outside of their direct control that could impact future condition/performance.

The FHWA received comments from 19 State DOTs (Arkansas, Colorado, Connecticut, Florida, Georgia, Iowa, Maine, Maryland, Michigan, Mississippi, Missouri, New Hampshire, Oklahoma, Oregon, Pennsylvania, Texas, Vermont, Virginia, and Washington State), AASHTO, AMPO, Atlanta Regional Council (ARC), Center for American Progress, Community Planning Association of Southwestern Idaho (COMPASS), National Association of Regional Councils (NARC), National Center for Pavement Preservation, NYMTC, Association of Texas Metropolitan Planning Organizations (TEMPO), and an anonymous commenter<sup>14</sup> generally indicating that State DOTs and MPOs have no authority or control over maintenance and/or investment decisions on some of the assets on NHS. Therefore, State DOTs and MPOs should not be held responsible for the reporting of data, target establishment, and the condition of these assets (i.e., significant progress determination). The letters from the Connecticut, Virginia, and Washington State DOTs and AASHTO argued that State DOTs may not be able to legally collect data on assets they do not own.

The AASHTO, AMPO, ARC, and the Mississippi and Tennessee State DOTs recommended that each agency (e.g., Federal Government, State DOT, tribal government, local agency, transit agency, and tolling authority) that has ownership of an NHS facility should report on and be held accountable for their portion of the system.

As stated above, the statutory provisions under 23 U.S.C. 150(c)(3) require the establishment of measures for “States to use to assess (I) the condition of pavements on the Interstate System; (II) the condition of pavements on the [NHS] (excluding the Interstate); [and] the condition of bridges on the [NHS]” for the purpose of carrying out the NHPP. Also, 23 U.S.C. 150(d) requires States to establish performance targets that “reflect the established measures.” The MAP-21 also provides a description of the limits (or components) of the Interstate System and National Highway System in 23

<sup>14</sup> FHWA-2013-0053-0135.



U.S.C. 103(c) and 23 U.S.C. 103(b), respectively, and defines the terms “States” and “MPOs” in 23 U.S.C. 101(a)(25) and 23 U.S.C. 134 (b), respectively. This statutory language in MAP-21 prescribes the applicability of the NHPP under 23 U.S.C. 119 and the applicability of performance measures and the scope of performance targets under 23 U.S.C. 150.

Considering this statutory language, MAP-21 requires that the performance management requirements (23 U.S.C. 150) and NHPP (23 U.S.C. 119) apply to the entire NHS and Interstate System and not to a subset of the NHS (*e.g.*, State DOT owned or operated Interstate System, State DOT owned or operated National Highway System), as the commenters would prefer. The MAP-21 does not define the terms “State” or “MPO” for purposes of 23 U.S.C. 150 and 119 as something other than already defined elsewhere in MAP-21. Accordingly, FHWA retains the language in section 490.105 (which requires that State DOTs and MPOs establish targets for the entire NHS and Interstate System within the State or metropolitan planning area, regardless of ownership).

As stated in the NPRM, FHWA recognizes that there is a limit to the direct impact State DOTs and MPOs can have on the performance outcomes within the State and the metropolitan planning area, respectively. The FHWA encourages State DOTs and MPOs to consult with relevant entities (*e.g.*, Federal Land Management Agencies, local transportation agencies, and tribal governments) as State DOTs and MPOs report performance data and establish targets. This will allow for a better assessment of the condition of pavements and bridges on the entire NHS and better identify and consider factors outside of their direct control that could impact future condition/performance.

In section 490.105(d), FHWA added the phrase “of this paragraph” to improve the clarity and consistency of the text. This addition did not change the intent of the original text in the NPRM.

In section 490.105(d)(1), FHWA made an editorial correction and replaced the word “areawide” with “area wide.”

The FHWA added cross reference numbers to section 490.105(d)(1)(i) through (iii) to clarify the specific section that corresponds to each measure. The original intent of the section did not change.

Section 490.105(d)(2) is reserved.

Discussion of Section 490.105(d)(3) NHS Limits

In section 490.105(d)(3), FHWA proposed requiring State DOTs to declare and describe NHS limits in their Baseline Performance Period Report at the beginning of each performance period for the purpose of target establishment, reporting, and progress evaluation and significant progress determination. To ensure consistency of network for target establishment, reporting, and progress evaluation and significant progress determination, the proposed language in section 490.105(d)(3) further specified that any changes in NHS limits during a performance period would not be accounted for until the following performance period. As explained in the NPRM, FHWA proposed this methodology because it recognized that if NHS limits changed after a State DOT establishes its targets, actual measured performance of the transportation network within the changed NHS limits would represent a different set of highways as compared to what was originally used to establish the target. As a result, this difference could impact a State DOT’s ability to make significant progress toward achieving targets.

The FHWA received individual letters from ARC, Cemex USA, Oregon DOT, and Texas DOT and a joint letter from the ACPA and PCA in relation to dealing with changes in NHS limits during a performance period. The letter from Texas DOT stated that the proposed approach in dealing with NHS limit changes may cause “overly burdensome” bookkeeping to keep track of NHS network changes. A similar comment was found in the joint letter from ACPA and PCA and the letter from Cemex USA which stated that the proposed method does not take into consideration new pavements or additional lanes constructed, thereby inadvertently penalizing States for expanding the NHS as a means of upgrading performance. They recommended that the measures should reflect the changes in NHS limits. They also added that since the proposed measures are percentage-based, measures reflecting NHS changes would accurately take into consideration improvements made without “artificially altering” performance indicators.

The Oregon DOT commented that the proposed approach appears to be too “inflexible” and may not reflect how investment decisions are actually made during the performance period due to changing route priorities. They added that the proposed approach “looks

backward in the mirror rather than forward which is needed to incorporate up to date planning and policy.”

Finally, ARC agreed with the proposed approach that a baseline network must be identified and “frozen” for purposes of a reporting cycle, but they suggested that at regular intervals (*i.e.*, 2 years), each State DOT should be permitted to adjust their networks and targets as they feel appropriate in collaboration with FHWA. The ARC commented that permitting the network to change on a regular basis does create a slight “apples to oranges” problem with analyzing long-term progress, but added that changes to the NHS network in reality are likely to be “infrequent and minimal” in impact when compared to the overall network.

Some additional comments related to the NHS limits were received by FHWA. The TEMPO and Texas DOT commented that the criteria used to identify the NHS are still being developed. They added that if this issue is not addressed before reporting and evaluation deadlines are implemented, State DOTs and MPOs could expend significant resources collecting, analyzing, and maintaining data that is not part of the final NHS. They also indicated that some portions of the NHS will not be included in the performance management effort resulting in “missing” data segments. The TEMPO and Texas DOT recommended FHWA should not set deadlines for reporting on and evaluating performance measures until the NHS has been established nationwide and accepted by FHWA. The Seattle DOT made similar comments that before imposing NHS-specific regulatory requirements, FHWA should reassess current NHS designation criteria based on functional classification to consider critical routes based on multiple criteria such as person trip volumes rather than on vehicle miles traveled.

The FHWA evaluated the arguments made by commenters regarding the approach for dealing with potential NHS limits changes during a performance period. The FHWA recognizes that NHS limits will directly impact the performance data collection coverage, measure calculation, the extent of targets, significant progress determination, and determination of minimum levels for condition of pavements and bridges. The FHWA agrees with the comments from ACPA, Cemex USA, PCA, and Texas DOT that the proposed approach would exclude realigned and newly constructed NHS roads/lanes in the measure calculation as a means of improved condition/

performance. In addition to the impacts of NHS expansion, FHWA examined NHS contraction. In case of a NHS contraction, the approach proposed in the NPRM would have required State DOTs to report metrics for the part of NHS no longer designated as NHS for the entire performance period. Moreover, for both expansion and contraction cases, FHWA anticipates that communicating and explaining to the general public the condition/performance of NHS based on previous NHS limit (*i.e.*, baseline) would be particularly difficult. In addition to evaluating the comments, FHWA analyzed historical changes in the NHS network using HPMS data for each State. Based on the historical data, in general, FHWA found that NHS network changes are relatively small except when NHS expansion was required under MAP-21. In such case, FHWA plans to issue guidance to deal with mandated changes in NHS limits for implementing performance management.

After consideration of the comments and the issues associated with the proposed approach dealing with the NHS limit changes, FHWA revised section 490.105(d)(3) in the final rule. The State DOTs are no longer required to declare and describe NHS limits in their Baseline Performance Period Report so the changes in NHS limits during a performance period would be accounted for. Since the National Highway System Data Item in HPMS and the Highway System of the Inventory Route Data Item in NBI are required to be reported to FHWA annually together with condition metric data, NHS limits for pavement condition measures will come from the same dataset submitted to HPMS in the same year as the condition metric data is submitted. The NHS designation for bridge condition measures will come from the same NBI data set as the condition metric data of the same year. Accordingly, FHWA removed section 490.107(b)(1)(ii)(E) because State DOTs no longer have to declare and describe NHS limits in their Baseline Performance Period Report. Also, FHWA amended section 490.109(d)(4). The NHS information for the baseline conditions, for the purpose of the significant progress determination of the achievement of the pavement and bridge condition targets, will come from the data reported in HPMS and NBI in the year in which the Baseline Period Performance Report is due to FHWA. The FHWA believes that the revised approach will eliminate the burden of bookkeeping of the multiple data sets by

State DOTs and MPOs and will improve communicating the performance with the public. The FHWA also believes that it will make the NHS extent consistent with other performance publications of State data (*e.g.*, Highway Statistics<sup>15</sup> and Condition and Performance Report to Congress<sup>16</sup>). Since the calculated measure reflects the NHS limit change, States DOTs and MPOs should consider anticipated NHS limit changes when establishing their targets.

Discussion of Sections 490.105(e)(1) and 490.105(f)(1) Implementation Timeline for State DOTs and MPOs

The FHWA proposed the requirements for State DOT and MPO performance targets in sections 490.105(e) and 490.105(f), respectively. Section 490.105(e)(1) specified the schedule for State DOT target establishment as “not later than 1 year of the effective date of this rule and for each performance period.” Also in the NPRM, section 490.105(f)(1) specified a schedule for MPO target establishment as “no later than 180 days after the respective State DOT(s) establishes their targets.” The proposed regulatory language specifying target establishment schedules came directly from the statutory language in MAP-21.<sup>17</sup> Accordingly, FHWA proposed a schedule in section 490.107(b) for State DOT target and progress reporting as the first report (*i.e.*, State Biennial Performance Report) that would be due to FHWA by October 1, 2016 and subsequent report due every 2 years on October 1 thereafter. The October 1, 2016, and subsequent biennial due dates are a statutory requirement.<sup>18</sup> To implement these statutory requirements in a consistent manner, FHWA proposed a definite period of time (*i.e.*, performance period) during which condition/performance would be measured, evaluated, and reported. The FHWA proposed a consistent time period of 4 calendar years that would be used to assess pavement and bridge conditions. The FHWA carefully examined this proposed time period so that it aligns with the timing of the biennial performance reporting requirements under 23 U.S.C. 150(e). This proposed time period is calendar year based so that it is consistent with data reporting requirements currently in

place to report pavement and bridge conditions.

During the development of the NPRM, FHWA anticipated the final rule for the proposal to be effective no later than October 1, 2015. The Oregon DOT commented that the effective date would be difficult to meet and suggested FHWA consider a delayed effective date of January 2017. As stated in the preamble of the NPRM, the October 1, 2015 date would have allowed for at least a 1-year period for State DOTs to establish targets so that they can be reported in the first biennial performance report (*i.e.*, Baseline Performance Period Report) that would be due to FHWA by October 1, 2016. The FHWA also stated in the preamble of the NPRM that it recognizes that if the final rule is effective after October 1, 2015, the due date to report State DOT targets for the first performance period may need to be adjusted, or FHWA would need to issue implementation guidance that would provide State DOTs a 1-year period to establish and report targets.

The FHWA received numerous comments that the 1-year duration between the effective date of this rule and the first reporting of targets (*i.e.*, Baseline Performance Period Report for the first performance period) is difficult for State DOTs and MPOs to meet.

The AASHTO and Connecticut DOT commented that the process to collect/analyze data, understand the trends, and establish targets will require additional time and that the submission of the first Baseline Performance Period Report by October 1, 2016, is “truly unrealistic.” The AASHTO and Mississippi and Connecticut DOTs argued that the opportunity for “cold weather States” to collect data for baseline condition/performance of 2015 is limited because all data has to be collected between the effective date (October 1, 2015) and the end of calendar year 2015 for 2016 condition/performance reporting. The North Dakota DOT and Seattle DOT made similar comments as AASHTO did. The Michigan and Minnesota DOTs expressed their support for the AASHTO comments.

The Texas DOT commented that State DOTs will need more time to transition and measure the metrics required that are not currently collected, and to develop some history to establish the targets, especially for the Interstate since the proposed metric is based on the overall condition.

The Mississippi DOT commented that many State DOTs already have multi-year contracts in place for their data collection. They said that the changes related to the expanded NHS and

<sup>15</sup> Highway Statistics (FHWA): <https://www.fhwa.dot.gov/policyinformation/statistics.cfm>.

<sup>16</sup> Conditions and Performance Report to Congress (FHWA): <https://www.fhwa.dot.gov/policy/2013cpr/>.

<sup>17</sup> 23 U.S.C. 150(d)(1) and 23 U.S.C. 134(h)(2)(C).

<sup>18</sup> 23 U.S.C. 150(e).



additional data requirements would make it impossible for many State DOTs to meet the proposed reporting timelines. Furthermore, they said that if additional data required under this rule is obtained, State DOTs will not have the historical data to analyze trends to effectively establish targets. The AMPO, COMPASS, and TEMPO made similar comments that the timeline in NPRM for identifying baseline condition/performance and reporting targets for the first performance period is “aggressive.” They added that the proposed timeline affords little ability or is insufficient for States to identify reasonably attainable targets.

The Southeast Michigan Council of Governments (SEMCOG) commented that the additional and unfamiliar data requirements (*i.e.*, cracking, faulting, rutting, and roughness data) make it difficult to meet the accelerated timelines for collecting the data. They noted that the NPRM assumes that they will be able to work with the Michigan DOT and finish the reporting within 1 year. They commented that the reporting time will actually be much less than 1 year, especially in the first year. The Missouri DOT stated that including cracking, rutting, and faulting metrics under this rule needs to be delayed until national standards are developed and vetted through a quality control process. They added that these metrics will result in additional costs to collect, analyze, and manage the data.

The New York State DOT cited that FHWA intends to use HPMS as a primary mechanism to report pavement performance data. The New York State DOT recommended that State DOTs be provided adequate time and resources to implement the necessary process and system changes.

The Michigan DOT added that their pavement performance management “took years to develop, test, and refine” and recommended an alternative implementation schedule and process until the national measures mature enough that State DOTs become confident using them as the basis for investment decisions. The NYMTC “strongly objected” to the proposed October 1, 2015, effective date for the data collection and reporting requirements associated with the performance measure rules because they do not have sufficient information available about current pavement conditions using the proposed measures and data collection methods. They also added that, given the constraints on available data and analysis tools, they cannot predict the future conditions.

The AASHTO and Connecticut and Tennessee DOTs suggested providing

State DOTs the opportunity to extend the deadline if they demonstrate that they are working toward and making progress in adopting all requirements. The AASHTO and Connecticut and North Dakota DOTs commented that the coordination for establishing targets will require additional time because it encompasses a wide range of performance areas that can be influenced by local and regional needs. The Michigan State Transportation Commission and Michigan Asset Management Council commented that FHWA must allow State DOTs sufficient time to adequately coordinate with local agencies after the rules are finalized but before implementation begins.

The AASHTO and Connecticut and Oregon DOTs recommended a 24-month phase-in period between the effective date and the first target reporting for the Interstate pavement and bridge condition measures in sections 490.307(a)(1) and (2) and 490.407(c). And, they recommended a 48-month phase-in period between the effective date and the first target reporting for the Non-Interstate NHS pavement condition measures in section 490.307(a)(3) and (4). The Alaska DOT&PF recommended at least a 4-year period to report all new data under this rule since the NHS has also changed with MAP-21. The AASHTO and Connecticut and Oregon DOTs also recommended delaying significant progress determination under section 490.109.

The NYMTC also asked FHWA to consider the impacts of this proposed rule on State DOTs and MPOs that must adjust their planning and programming processes to the new requirements under this rule. The NYMTC requested that FHWA lengthen the amount of time before penalties are imposed so that State DOTs and other agencies could make adjustments while they have the maximum amount of flexibility in the use of available funding.

The AASHTO and Connecticut and New Jersey DOTs commented that the time frame for enacting minimum condition level determination for bridges under section 490.413 is too short. They commented that State DOTs will have no time to assess their current situation and then implement reasonable projects to meet the 10 percent threshold. The AASHTO and Connecticut and Oregon DOTs recommended not determining minimum condition levels under sections 490.315 and 490.411 until 48 months after the effective date.

The FHWA appreciates the comments on the proposed timeline. The FHWA understands that collection of new data items, development of tools,

coordination, planning process adjustments, and integrating with other regulatory requirements to implement this rule will take time and effort for State DOTs. The FHWA recognizes that data required in section 490.309 for the pavement condition measures is new to some State DOTs. Therefore, FHWA amended the proposed data collection timeline for the pavement condition measures to reflect the effective date of this final rule. (See discussion section for section 490.309(a) for data collection timeline for the pavement measures.) Accordingly, FHWA retains phase-in requirements related to the targets for Interstate pavement measures and significant progress determination for those targets, as provided in sections 490.105(e)(1) and 490.109(e)(3), respectively, so that the effective date of this final rule is reflected. The FHWA also retains the transition of non-Interstate pavement measure in section 490.313(e) as proposed.

In addition to the challenges associated with new data items, FHWA recognizes that State DOTs are challenged with NHS expansion, lack of historic data and analytical tools for establishing targets, additional coordination requirements, adjustment to their planning process, and integrating with other regulatory requirements. However, as stated previously, State DOT target establishment “not later than 1 year of the effective date of this rule” in section 490.105(e)(1) is a statutory requirement under 23 U.S.C. 150(d). The date for reporting progress toward targets of October 1, 2016 is also a statutory requirement in 23 U.S.C. 150(e). Therefore, FHWA cannot delay the due date of State DOT target establishment or reporting on performance targets.

Since this rule is being issued and effective after October 1, 2016, FHWA issued guidance<sup>19</sup> on the Initial State Performance Report on August 31, 2016, to provide State DOTs the opportunity to comply with the statutory deadline for the first performance report under 23 U.S.C. 150(e). In this guidance, FHWA recognized that State DOTs would not have established targets for the measures in this rule. The FHWA simplified the reporting requirement by only requiring a description of the planned processes for target establishment and coordination with relevant MPOs and other agencies that will occur in the selection of targets. The FHWA has amended the implementation timeline to reflect the

<sup>19</sup> FHWA Guidance: Initial State Performance Report: <http://www.fhwa.dot.gov/tpm/guidance/160831.cfm>.



effective date of this final rule. (See subsequent discussion in this section for more details on timeline adjustments.)

In response to the comments from AASHTO and Connecticut and New Jersey DOTs above, FHWA disagrees that the time frame for enacting minimum condition level determination for bridges on the NHS is too short and that State DOTs will have no time to assess their current situation and then implement reasonable projects to attempt to meet the 10 percent threshold. The MAP–21 was enacted in October 2012. In September of 2012, FHWA provided initial guidance through its MAP–21 Bridge Q&A Web site<sup>20</sup> on how FHWA intended to implement the statutory requirements under the 23 U.S.C. 119(f)(2). Additionally, State DOTs are familiar with the classification of structurally deficient as it had been used for decades to implement the Highway Bridge Program. Because of this familiarity, State DOTs are well aware of their current situation in regards to structurally deficient bridges on the NHS. Based on FHWA guidance provided on the MAP–21 Bridge Q&A Web site, which describes the implementation schedule of the minimum condition level determination, and the familiarity State DOTs have with the classification of structurally deficient, State DOTs have had sufficient time to take actions to meet the 10 percent threshold. Because of its long implementation history and State DOTs’ familiarity with the classification of structurally deficient bridges, FHWA believes that implementing the requirement of 23 U.S.C. 119(f)(2) does not depend on the effective date of this rule. Moreover, FHWA has been examining NBI data that State DOTs have been reporting since the enactment of MAP–21 and found sufficient evidence that State DOTs are taking actions to meet the statutory requirement. For example, if the 2013 NBI data was used as the baseline for structurally deficient bridges carrying the NHS, then there were potentially 13 State DOTs that would have been affected by the penalty if the trend of percentage structurally deficient deck area of greater than 10 percent continued for another 2 years. However, based on the 2014 NBI data, the number of State DOTs that would be affected by the penalty dropped to eight. Based on 2015 NBI data, the number dropped even further to six State DOTs. This dramatic change in the potential number of States leads FHWA to

conclude that some State DOTs have taken action in addressing their NHS structurally deficient bridges. Therefore, FHWA believes that a delay in implementing the 23 U.S.C. 119(f)(2) provision is not necessary.

The Louisiana DOT recommended the first data collection cycle, to be used in performance analysis, be pushed back to a later date. The Louisiana DOT cited a large number of conflicts between HPMS, the AASHTO specifications, the Fiscal Management Information System (FMIS) requirements for HPMS, and the proposed rules. They commented that these conflicts will not allow an “apples to apples” data comparison or analysis between the current year and future years, nor among States. However, the Louisiana DOT did not identify how delaying the start of the data collection would mitigate the perceived conflicts or how anything having to do with the FMIS impacts the data reporting for HPMS. The FHWA understands that State DOTs will need some time to adjust contracts and programs to meet the data reporting requirements and the final rule has identified the first reporting dates to be 2019 for Interstate routes and 2021/2022 for non-Interstate NHS routes.

A letter<sup>21</sup> from the State DOTs of Maine, New Hampshire, and Vermont recommended a bi-directional format to support FMIS, which intends to use HPMS data as its source. In the NPRM, FHWA proposed Interstate pavement condition data to be collected on both directions of the Interstate highway in section 490.309(b)(1)(i). However as a result of further studies,<sup>22</sup> FHWA amended section 490.309(b)(1)(i) so that the pavement condition data collection on Interstate is only required in one direction of highway, eliminating the need for examining a bi-directional format to support FMIS and the potential discrepancies with HPMS.

The AMPO and COMPASS stated that the process for amending Metropolitan Planning Agreements is a time consuming and requires considerable opportunity for public input. They recommended a timeline that could lead to more realistic targets. The AASHTO, NYMTC, and Oregon and Washington DOTs urged FHWA to delay the MPO target establishment requirement until the start of the second performance period. They argued that there will be lack of complete (*i.e.*, full extent) performance data for cracking, rutting,

and faulting for the Non-Interstate NHS, where full extent data will only be collected for the second half of the first performance period, as described in sections 490.309(b)(2)(ii) and 490.313(e). They added that until complete data is collected and evaluated, the MPOs might have a difficult time understanding the complexities of this data and establishing targets. They also recommended delay because it will allow additional time for State DOTs and MPOs to further develop their collaborative efforts in response to this rule and the Asset Management Plan rule (23 CFR 515). The NARC commented that additional time for MPOs would be helpful because of the significant collaboration and the data collection requirements in this rule.

The SEMCOG expressed the opinion that a piecemeal approach is being used to develop the performance measures in this rule. This approach makes it difficult to identify the total system performance requirements, the complete data needs, and costs to collect the required data and to program and implement projects to address the performance measures.

The FHWA appreciates these comments and understands that implementing this rule takes time and effort for MPOs as they face similar challenges to State DOTs. In response to comments related to the Metropolitan Planning Agreement, FHWA amended the language in section 490.107(c)(1) to remove the requirement to use the agreement as the means to document how MPOs will report their established targets to their respective State DOTs. The FHWA also amended the language in section 490.105(f)(8) to remove the requirement to document the target adjustment process in the Metropolitan Planning Agreement. (See discussion sections for sections 490.105(f)(8) and 490.107(c)(1) for more details on Metropolitan Planning Agreement for MPO target adjustment and reporting, respectively.) The FHWA re-iterates that the State DOT target establishment schedule of “not later than 1 year of the effective date of this rule” in section 490.105(e)(1) and MPO target establishment schedule of “no later than 180 days after the respective State DOT(s) establishes their targets” in section 490.105(f)(1) are statutory requirements under 23 U.S.C. 150(d) and 23 U.S.C. 134(h)(2)(C), respectively. Therefore, to meet the statutory mandates, FHWA cannot delay the due date of the MPO target establishment. (See discussion on MPO implementation schedule in section 490.105(f)(1).)

<sup>21</sup> Docket Document FHWA–2013–0053–0096—<http://www.regulations.gov/#!documentDetail;D=FHWA-2013-0053-0096>.

<sup>22</sup> “Evaluation of Pavement Conditions on the Interstate System: Preliminary Summary”, Rada 2015.

<sup>20</sup> Question and Answer #2 at: <http://www.fhwa.dot.gov/map21/qandas/qabridges.cfm>.

As discussed above and in the NPRM, FHWA described its plans in the event that the final rule would not be effective until after October 1, 2015. The FHWA stated in the NPRM that, if it becomes clear that the final rule will not be effective until after October 1, 2015, FHWA would consider adjusting the first performance period in the final rule or would issue implementation guidance that would provide State DOTs a 1-year period to establish and report targets. As this rule is issued and effective after October 1, 2015, providing State DOTs less than 1 year to establish targets prior to the October 1, 2016 report, FHWA has amended the timeline in the final rule. These adjustments are necessary to ensure that State DOTs have at least 1 year between the effective date of this rule and biennial performance reporting of their target while adhering to the statutory reporting due dates<sup>23</sup> under 23 U.S.C. 150(e). Therefore, as stated in the NPRM, FHWA amended the due date for State DOT on reporting their targets for the first performance period from October 1, 2016, to October 1, 2018. To accommodate the amendment of the reporting date for the first performance period, FHWA adjusted the start of first performance period (and start dates for subsequent performance periods) in the final rule so that target reporting could be aligned with corresponding performance periods. Although the due date for State DOT on reporting their targets for the first performance period is October 1, 2018, this amendment does not exempt State DOTs from the October 1, 2016, report required under 23 U.S.C. 150(e). As such, FHWA issued guidance<sup>24</sup> on the Initial State Performance Report on August 31, 2016, to provide State DOTs the opportunity

to comply with the statutory deadline for the first performance reporting under 23 U.S.C. 150(e). In this guidance, FHWA recognized that State DOTs would not have established targets for the measures in this rule. The FHWA simplified the reporting requirement by only requiring a description of the planned processes for target establishment and coordination with relevant MPOs and other agencies that will occur in the selection of targets. Since this final rule was not effective by October 1, 2015, FHWA adopted the following in this final rule:

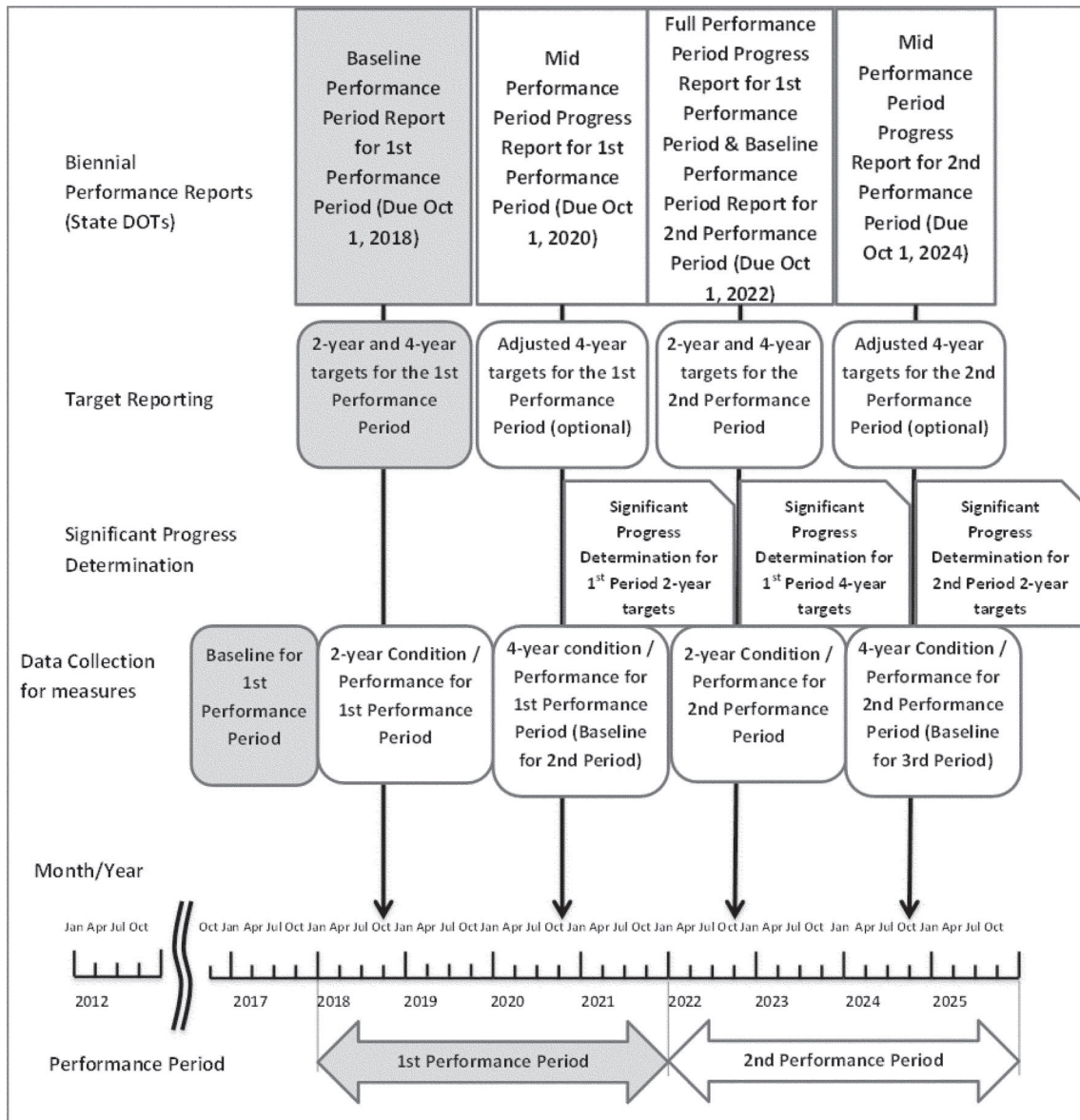
- State DOTs shall establish targets for the first performance period not later than 1 year of the effective date of this rule as specified in section 490.105(e)(1) to meet the statutory requirement in 23 U.S.C. 150(d).
- The MPOs shall establish targets for the first performance period no later than 180 days after the respective State DOTs establish their targets as specified in section 490.105(f)(1) to meet the statutory requirement under 23 U.S.C. 134(h)(2)(C).
- The first performance period shall begin on January 1, 2018, and shall end on December 31, 2021, and subsequent 4-year performance periods shall follow thereafter, as provided in as provided in section 490.107(b) and shown in Figure 1 below.
- The State DOTs will begin collecting Interstate pavement condition data (IRI, rutting (asphalt pavements), faulting (jointed concrete pavements), and Cracking Percent) in accordance with section 490.309(b)(1) in calendar year 2018.
- The State DOTs will begin collecting non-Interstate NHS pavement condition data (IRI, rutting (asphalt pavements), faulting (jointed concrete pavements), and Cracking Percent) in accordance with section 490.309(b)(2) in calendar year(s) 2020/2021.
- The State DOTs shall submit their first biennial performance report (*i.e.*,

Baseline Performance Period Report for the first performance period) on October 1, 2018. Subsequent biennial performance reports are due every 2 years after the first biennial performance report, as provided in section 490.107(b).

- The FHWA will make first significant progress determinations after State DOTs report their Mid Performance Period Progress Report for the first performance period on October 1, 2020, and biennially thereafter.
- The FHWA will not make a determination of significant progress toward the achievement of 2-year targets for Interstate System pavement condition measures in calendar year 2020, as discussed in section 490.109(e)(3)(i).
- To meet the statutory requirement under 23 U.S.C. 119(f)(2), FHWA will make the first minimum bridge condition level determination in calendar year 2016 (by October 1, 2016) and in calendar year 2017 (by October 1, 2017) by considering structurally deficient as a classification given to a bridge which has significant load carrying elements in Poor or worse condition, or the adequacy of the waterway opening provided by the bridge is determined to be insufficient to the point of causing overtopping with intolerable traffic interruptions. Beginning with calendar year 2018 and each calendar year thereafter, FHWA will make the minimum bridge condition level determination by considering structurally deficient as a classification given to a bridge which has any component in Poor or worse condition, as defined in section 490.405 and described in section 490.411(b).
- The FHWA will make the first minimum Interstate pavement condition level determination by October 1, 2019, and each year thereafter, as provided in section 490.317.

<sup>23</sup> Report no later than October 1, 2016 and biennially thereafter.

<sup>24</sup> FHWA Guidance: Initial State Performance Report: <http://www.fhwa.dot.gov/tpm/guidance/160831.cfm>.



**Figure 1 – Biennial Performance Reports – The Baseline Performance Period Report**

The FHWA retains the language in section 490.105(e)(1), as proposed in the NPRM, because the due date for State DOT target establishment of “not later than 1 year of the effective date of this rule” in this paragraph is a statutory requirement under 23 U.S.C. 150(d).

Discussion of Sections 490.105(e)(2) and 490.105(f)(2) Target Coordination

Sections 490.105(e)(2) and 490.105(f)(2) specify State DOT and MPO coordination requirements for the establishment of targets, as provided in 23 U.S.C. 135(d)(2)(B)(i)(II) and 23 U.S.C. 134(h)(2)(B)(i)(II). In the NPRM, FHWA sought comment on alternative approaches that could be considered to

effectively implement the coordination requirements under MAP-21.

The Mid-America Regional Council supported the language that encourages State DOT and MPO coordination “to the extent practicable” in target establishment. They also encouraged FHWA to offer guidance and share best practices of coordination among neighboring States and MPOs. The New York State Association of Metropolitan Planning Organizations (NYSAMPO) supported the language in section 490.105(e)(2). They also noted that a “significant portion” of the NHS in New York is owned by local governments and public authorities. They pointed out that the rule is silent on coordination

with other owners and noted that they would support language requiring such coordination. The Orange County Transportation Authority made a similar comment and urged FHWA to include language to support MPO coordination with county transportation commissions and local DOT districts to establish targets and funding priorities, and to allow targets to be established at the sub-regional level.

The Mid-America Regional Council also commented that if State DOTs choose to establish additional targets, under section 490.105(e)(3), for urbanized areas, the rule should encourage coordination with the corresponding MPOs.



The Florida DOT shared their coordination efforts in their letter. The Florida DOT held performance measure workshops in 2014 and 2015 for the representatives of various State DOT Offices, Federal Transit Administration, MPOs, and FHWA. They stated that the workshops resulted “in a rich dialogue with numerous ideas and opinions conveyed through discussion and in writing.” The Florida DOT also indicated in their letter that a Performance Measurement Collaboration Task Force has been formed to coordinate performance measurement activities with FHWA, FTA, Florida’s 27 MPOs, and the Florida Metropolitan Planning Organization Advisory Council. According to Florida DOT, the task force will continue to be used to exchange information during the rulemaking process and implementation. The Florida DOT also indicated that they plan to examine opportunities for data sharing, coordinated target establishment, and combined reporting where practical and efficient. They added that they will look for better ways to communicate the importance of good transportation performance to their State’s economy and their quality of life. The FHWA appreciates the Florida DOT sharing their coordination efforts.

The Illinois DOT commented that the portions of NHS which are not under the jurisdiction of the State DOT will require coordination between Illinois DOT and MPOs on the selection of targets to ensure consistency, to the maximum extent practicable.

The AASHTO and the Connecticut and Oregon DOTs commented that performance measurement and management of NHS pavements and bridges are not the only part of the planning effort State DOTs must undertake in order to deliver a successful program to the public. They emphasized that other tasks and the level of effort and coordination with local agencies, the public, and other stakeholders is “substantial.” They urged FHWA to recognize that the entire process to collect/analyze data, understand the trends, and establish targets needs to be made across a wide range of performance areas that can be influenced by local and regional needs. Finally, they commented that “coordination takes time.”

The AASHTO and the Oregon and Washington DOTs disagreed with the phrase “to ensure consistency, to the maximum extent practicable” in sections 490.105(e)(2) and 490.105(f)(2). They recommended that the regulatory text change to “to facilitate or encourage consistency.” They argued that this

modification would reduce the chances of unreasonable expectations on State DOTs during the implementation.

An anonymous commenter<sup>25</sup> stated that coordination between key stakeholders (such as MPOs) and State DOTs needs to be more active. The commenter argued that requiring consultation with MPOs is not enough, and collaboration in goal development is important. Another anonymous commenter<sup>26</sup> noted the importance of performance and funding for the entire statewide-non-Interstate NHS and commented that a State DOT should not be allowed to give preference to funding projects on highways within their jurisdiction merely because they are within their jurisdiction.

The North Carolina DOT commented that most of the NHS in North Carolina is owned and operated by North Carolina DOT. They inquired whether or not coordination is “relevant” for North Carolina DOT.

The Northeast Ohio Areawide Coordinating Agency commented that, unless there is a financial rationale or specific policy to coordinate targets, coordination is unlikely, particularly as State laws varies regarding the responsibility of asset management.

The Southern California Association of Governments (SCAG) recommended clear provisions be provided that outline the exact coordination process between State DOTs and MPOs toward the establishment of performance targets. A private citizen, Joyce Dillard, commented that the development of consistent targets across a State can only be achieved when the targets take into account State required plans already in existence, such as the General Plan and its Circulation Element.

Finally, the NARC commented that the success of the national performance management program will rely in part on the extent to which State DOTs and their MPOs are able to work together, establish common ground, and find complementary purpose. They made reference to the discussion of section 490.105(e)(2) in the NPRM which states “FHWA recognizes the need for State DOTs and MPOs to have a shared vision on expectations for future condition/performance in order for there to be a jointly owned target establishment process.” The NARC stated that “in some cases, this shared vision is a difficult—if not impossible—standard.” The NARC encouraged FHWA to foster a “shared vision,” and recommended that FHWA “take a deeper look” into case studies, peer exchanges, and other

input from State DOTs and MPOs in coordination for the establishment of targets. Finally, NARC commented that this is an opportunity to explore existing relationships between State DOTs and MPOs, and create stronger ties between them.

The FHWA appreciates the comments received regarding coordination. The FHWA plans to provide technical assistance to the State DOTs and MPOs through a number of means, including the issuance of guidance, conducting peer reviews and workshops, sharing best practices, and conducting training on topics such as target setting, implementation of performance-based planning and programming, interagency coordination, data collection, and performance progress reporting. The language in sections 490.105(e)(2) and 490.105(f)(2) mirror the statutory language in 23 U.S.C. 135(d)(2)(B)(i)(II) and 23 U.S.C. 134(h)(2)(B)(i)(II) and the regulatory language in 23 CFR 450.206(c)(2) and 23 CFR 450.306(d)(2)(iii) of the final Planning Rule. The FHWA believes the phrase “selection of targets” in 23 U.S.C. 135(d)(2)(B)(i)(II) and 23 U.S.C. 134(h)(2)(B)(i)(II) applies to adjustment of targets. The FHWA expects State DOT and MPO coordination requirements to be carried out for both establishment and adjustment of State DOT and MPO targets in sections 490.105(e)(2) and 490.105(f)(2). The final Planning Rule considers performance target selection as part of statewide and metropolitan transportation planning processes. Therefore, as part of the target selection process, State DOTs are required to consider the concerns of relevant Federal Land Management agencies and Indian tribal governments, and cooperate with affected local elected and appointed officials with responsibilities for transportation (or applicable regional transportation planning organization(s) identified in 23 CFR 450.208(a)), when selecting performance targets. (See 23 CFR 450.206, 23 CFR 450.208, and 23 CFR 450.306 of the final Planning Rule for more details on planning and coordination processes.) The FHWA also encourages State DOTs to coordinate with relevant MPOs and other stakeholders identified in 23 CFR 450.208(a) when establishing additional targets, described in section 490.105(e)(2).

The FHWA amended language in sections 490.105(f)(8) and 490.107(c)(1) to remove the requirement to document the target adjustment process and reporting of targets in the Metropolitan Planning Agreement. The FHWA replaced it with a requirement to

<sup>25</sup> Comment #: FHWA–2013–0053–0140.

<sup>26</sup> Docket Document FHWA–2013–0053–0135.

document the target adjustment process in a manner that is mutually agreed upon by State DOTs and MPOs. (See discussion sections for sections 490.105(f)(8) and 490.107(c)(1).) The FHWA recognizes that the performance management of NHS pavements and bridges are not the only part of the planning effort State DOTs and MPOs are required to undertake. The FHWA also recognizes that the level of effort and coordination with local agencies, the public, and other stakeholders is substantial and takes time. As discussed in section 490.105(d), the target scope (or the extent of target) for a State DOT consists of the entire NHS within the State, and the target scope for an MPO is the entire NHS within the metropolitan planning area. For this reason, State DOTs and MPOs are required to establish targets for the entire system within their respective areas, regardless of who owns the system. The section also requires close coordination between State DOTs and MPOs in selection of State DOT and MPO targets.

In response to the comments from North Carolina DOT and Northeast Ohio Areawide Coordinating Agency, coordination in the target selection process is required under 23 U.S.C. 135(d)(2)(B)(i)(II) and 23 U.S.C. 134(h)(2)(B)(i)(II), as stated above. Therefore, coordination is not an option, but it is a requirement under statute. Moreover, coordination for target selection is not bound by ownership of assets or asset management responsibilities, but must be consistent with coordination requirements in the statewide and metropolitan transportation planning processes.

In response to SCAG's comments, FHWA believes that the exact coordination process for target selection of an area should be determined by the relevant State DOTs and MPOs in that area. To help establish this process, FHWA plans to provide best practices, Webinar opportunities, and other resources on target selection coordination processes so that the coordination process is effectively implemented.

As stated earlier, the phrase "to ensure consistency, to the maximum extent practicable" in sections 490.105(e)(2) and 490.105(f)(2) is statutory language in 23 U.S.C. 135(d)(2)(B)(i)(II) and 23 U.S.C. 134(h)(2)(B)(i)(II). The FHWA retains the language in sections 490.105(e)(2) and 490.105(f)(2), as proposed in the NPRM.

#### Discussion of Section 490.105(e)(3) Additional Target

The FHWA proposed to allow State DOTs to establish additional targets for any of the proposed measures in subparts C and D, beyond the required statewide target. The State DOT may establish additional targets for any number and combination of urbanized areas and a target for the non-urbanized area for any or all of the proposed measures. This is intended to give State DOTs flexibility when establishing targets, and to aid State DOTs in accounting for differences in urbanized areas and the non-urbanized area. For example, a State DOT could choose to establish additional targets for a single urbanized area, a number of urbanized areas, or all urbanized areas separately or collectively. For State DOTs that want to establish a non-urbanized target, it would be a single target that applies to the non-urbanized area statewide. In the NPRM, FHWA sought comments on optional additional targets for urbanized and non-urbanized areas. The FHWA also sought comments on any other flexibility it could provide related to the voluntary establishment of additional targets.

The AASHTO and the Connecticut and New York DOTs supported the proposed approach for optional additional targets for urbanized and non-urbanized areas beyond the required statewide target. The AASHTO stated that State DOTs will voluntarily establish additional targets for various geographical boundaries on an ad hoc basis, working with their MPOs and local agencies. The AASHTO added that no other flexibilities need to be provided except that the establishment of additional targets should be at the sole discretion of State DOTs and not encumbered by Federal reporting or other requirements. The Connecticut and New York DOTs echoed AASHTO's comment.

The Georgia DOT commented that the proposed approach provides adequate flexibility in setting targets that will allow differentiation between urban and rural areas. The New Jersey DOT recommended allowing additional targets based on jurisdictional limits of each of the various stewards of the NHS and bridge ownership boundaries. The Oregon DOT recommended allowing States to establish targets of importance to them to provide flexibility in additional targets. The Tennessee DOT stated that they do not believe that it is necessary to provide for separate targets for urbanized and non-urbanized areas at this time.

The Texas DOT commented that optional targets for Texas may be needed for operational needs, but not for collective reporting. They added that many factors could come into play in optional targets, such as climate zones, subgrade, massive industry expansion (e.g., energy sector). The Texas DOT incorporates these factors into district level target setting as it relates to pavement asset condition. They noted that these district level targets accumulate to one State target.

The Missouri State DOT commented that the additional targets should only be considered "if the MPOs desire to have a different target than the State DOT." The Mid-America Regional Council and NARC commented that when a State DOT chooses to establish urbanized and non-urbanized area targets, State DOTs should be encouraged or required to coordinate those targets with relevant MPOs and rural transportation planning organizations. The TEMPO recommended usage of the terms "rural," "urban," and "urbanized" areas, and recommended urbanized area targets for the NHS. The NYMTC, PSRC, and Joyce Dillard recommended that additional flexibility should be provided for State DOTs to establish targets for metropolitan planning areas or urbanized areas. Joyce Dillard also suggested that MPO areas should be viewed in sub-areas for Transportation Management. The NYMTC added that one benefit of using metropolitan planning areas is that the boundaries are likely to change less frequently than urbanized area boundaries, allowing for a longer period of time during which measures would be evaluated on a consistent basis.

Questions were asked by several agencies regarding the additional targets. The Florida DOT asked the reason for the requirements in section 490.105(d)(3) for declaring and describing urbanized area boundaries within the State boundary in the Baseline Performance Period Report (required by section 490.107(b)(1)) for the additional targets. The Colorado DOT questioned the advantages of setting additional targets when these targets are not subject to significant progress determinations under section 490.109(e). Similarly, the NEPPP questioned the incentive of establishing additional targets.

The FHWA appreciates the comments on the voluntary establishment of additional targets and on other flexibilities it could provide. The FHWA strongly encourages State DOTs to monitor condition/performance by different geographic areas (e.g.,

jurisdiction, population, functional class, planning, terrain, and climate) to better understand the location dependency of condition/performance. The FHWA encourages State DOTs to establish targets beyond the required statewide targets where they feel necessary. The FHWA agrees with the comments from AASHTO and the Connecticut and New York State DOTs that State DOT established targets beyond the required statewide targets are at the sole discretion of State DOTs. This agreement was evident in the NPRM and in this final rule because the language does not require State DOTs to establish these targets. However, if a State DOT decides to establish urban or non-urbanized area targets beyond the required statewide targets, FHWA expects that State DOT to meet the coordination and reporting requirements under sections 490.105(e)(2) and 490.107(b). Although urban or non-urbanized area targets are not subject to significant determination under section 490.109, FHWA feels that the coordination and reporting requirements are necessary because once those targets are reported to FHWA (and become available to the public), the transparency and accountability of those targets will be expected by the public. For these reasons, FHWA retains the language in sections 490.105(e)(3)(i), (e)(3)(ii), and (e)(3)(iv) so that State DOTs have the maximum flexibility in monitoring condition/performance by different geographic areas and establishing targets beyond the required statewide targets, while preserving State DOT discretion to establish those targets. However, FHWA revised the language in section 490.105(e)(3)(iii) by striking the phrase “available to FHWA” in the paragraph because the urbanized area data reporting requirement is already covered in section 490.103(b).

#### Discussion of Section 490.105(e)(4) Performance Period Length and Schedule Alignment

The FHWA proposed a definitive performance period while recognizing that planning cycles and time-horizons for long-term performance expectations differ among State DOTs and MPOs. The FHWA understands that, although differences exist, it is necessary to provide for consistency in performance periods and proposed a 4-year performance period considering: (1) Providing for a link between the interim short-term targets (*i.e.*, 2-year and 4-year time horizons) to individual State DOT’s long-term performance expectations as part of a performance-based planning and programming process; (2) ensuring the time horizon is long enough to allow

for condition/performance change to occur through the delivery of programmed projects; (3) aligning the schedule of reporting on targets and the evaluation of progress toward achieving the targets with the biennial performance reporting requirements under 23 U.S.C. 150(e); and (4) reporting targets using a consistent performance period as part of the evaluation of State DOT effectiveness in the performance-based planning process provided to the Congress, as required by 23 U.S.C. 135(h). Therefore, 2-year targets represent the anticipated or intended condition/performance level at the midpoint of each performance period, and 4-year targets represent the anticipated or intended condition/performance level at the end of each performance period. As stated in the NPRM, it is important to emphasize that established targets (2-year targets and 4-year targets) should be considered as interim conditions/performance levels that lead toward the accomplishment of longer term performance expectations in a State DOT’s long-range statewide transportation plan<sup>27</sup> and NHS asset management plans.<sup>28</sup>

Two main issues on the proposed 4-year performance period were raised by the commenters: (1) The 4-year performance period duration is too short for noticeable changes in the condition of bridges and pavements and for demonstrating the impact of the investments<sup>29</sup> and (2) the timeline of the performance periods does not align with planning cycle of State DOTs and MPOs.<sup>30</sup>

The ASCE commented that the proposed regimen of performance period and progress reporting “is in accordance with the intent of MAP-21 and will help document the strides that States are making to improve asset conditions.” They also recommended

<sup>27</sup> 23 U.S.C. 135(f).

<sup>28</sup> 23 U.S.C. 119(e).

<sup>29</sup> AASHTO; Transportation for America; the Southeast Pavement Preservation Partnership; the State DOTs of California, Connecticut, Idaho, Iowa, Minnesota, Montana, New Jersey, New York State, North Dakota, South Dakota, Texas, and Wyoming; Rural Counties Task Force; the Organ County Transportation Authority; the Oversight Committee for California local Streets and Road Needs Assessment; TEMPO; the Metropolitan Transportation Commission, the Southern California Association of Governments; Nashville Area MPO.

<sup>30</sup> State DOTs of Connecticut, New York, and Texas, the National Association of Regional Councils, the New York State Association of Metropolitan Planning Organizations, the New York Metropolitan Transportation Council, the Association of Metropolitan Planning Organizations, Atlanta Regional Commission, the Association of Texas Metropolitan Planning Organizations, and the Community Planning Association of Southwestern Idaho.

that FHWA pay particularly close attention to the investment strategies section of progress reviews to help ensure that States are prioritizing investment decisions in a way that will help them reach their intended targets in accordance with national goals. Nicholas Cazares<sup>31</sup> commented that the proposed approach of performance period is “reasonable.” The Center for American Progress commented that a 4-year performance period is of adequate length to allow States to “make or fail to make progress.”

However, AASHTO and the California, Connecticut, and Texas DOTs commented that the condition of bridges and pavements does not change a great deal in relatively short time periods (*i.e.*, 2-year and 4-year). Additionally, the AASHTO and the Texas DOT provided an example of “a bridge built with a design life of 75 years does not normally show a great amount of change from one inspection cycle to the next (every 2 years).”

The AASHTO, Metropolitan Transportation Commission, Nashville Area MPO, Orange County Transportation Authority, Oversight Committee for the California Local Streets and Road Needs Assessment, Rural Counties Task Force, SCAG, and TEMPO and the State DOTs of California, Colorado, Connecticut, Iowa, New Jersey, and Texas commented that “planning, programming, project delivery, data collection, data reporting of projects” typically takes much longer than 4 years, so the impact of infrastructure investment programs on condition/performance would be difficult to demonstrate with short-term targets (2-year and 4-year targets). The AASHTO and Connecticut and New York DOTs recommended providing State DOTs and MPOs the flexibility to voluntarily establish long-term targets (10 years or more) outside of the regulatory framework and recommended report progress on a 4- or 5-year interval. The Metropolitan Transportation Commission, Nashville Area MPO, Orange County Transportation Authority, the Oversight Committee for the California Local Streets and Roads Needs Assessment, and the Rural Counties Task Force recommended target establishment cycles between 5 and 10 years. The SCAG and TEMPO recommended that performance periods should be at least 10 years. The California and Texas DOTs recommended a 10-year performance period with a 5-year mid performance period progress report. The New York DOT also suggested a 5-year

<sup>31</sup> Docket Letter FHWA–2013–0053–0078.



reporting cycle. The North Carolina DOT suggested 6- to 8-year goals for the bridges. The State DOTs of Idaho, Montana, New York, North Dakota, South Dakota, and Wyoming recommended a longer reporting cycle. Transportation for America recommended the reporting period be 8 or 10 years.

The letters from AMPO, COMPASS, Iowa DOT, Nashville Area MPO, SEMCOG, TEMPO, and Transportation for America suggested that the performance period should coincide with State DOT and MPO Long Range Plan (LRP) cycles. Transportation for America stated that not aligning the performance period with the LRP cycle “creates a disincentive for these important entities to engage in the performance measure targeting and investment process or place an undue burden for these entities to conduct planning and target setting outside the planning process.” The AMPO and COMPASS added that the misalignment of performance periods may cause confusion when discussing baseline conditions and targets within the LRP.

The Iowa DOT indicated that due to their 5-year planning and program development cycle, much of the investment planned for the time period of 2016 through 2020 will already be set by the time these rules go into effect. They added that they have limited ability to make changes, and it may take some time for them to redirect investment, if the national measures indicate different investment prioritization. Similarly, North Carolina DOT indicated that the 2 and 4 year periods will result in their State setting targets based on work that is already planned rather than targets that represent desired long-term system improvement.

The TEMPO did not support the 4-year frequency proposal and argued that MAP-21 does not specify target dates, ranges, or frequencies. They added that State DOTs and MPOs should be allowed to fulfill the continuing, cooperative, and comprehensive process as it relates to the establishment of feasible performance targets and their use in planning activities and documents. They also made a comment that State DOTs and MPOs should establish appropriate targets and meet the statutorily required biennial progress report for each target. Lastly, they rejected any specific target year or target setting frequency proposed by other entities under this and all other related rulemakings.

Finally, the Minnesota DOT indicated that the proposed framework requiring 4-year performance periods with both 2-

year targets and 4-year targets may be overly complex.

The FHWA is aware that pavement and bridges deteriorate slowly and agrees with the comments from AASHTO and the State DOTs of California, Connecticut, and Texas. However, it is important to recognize the difference between condition changes for individual pavement sections or individual bridges over time versus condition changes of system network or system deck areas over time. To confirm this difference, FHWA examined both pavement and bridge condition trends using the proposed condition measures and found noticeable changes over 2-year and 4-year time periods.<sup>32</sup> This is also evident in the letter submitted by Oregon DOT<sup>33</sup> for their bridge condition trends using the proposed bridge measures. This analysis provided sufficient evidence for FHWA to believe that the magnitude of percentage of system changes in Good and Poor condition for bridges is noticeable.

As stated in the NPRM, established targets (2-year target and 4-year target) would need to be considered as interim conditions/performance levels that lead toward the accomplishment of longer term performance expectations in State DOT long-range statewide transportation plans<sup>34</sup> and NHS asset management plans.<sup>35</sup> In order to avoid confusion, FHWA used the term “longer-term performance expectations” in the NPRM to distinguish between longer term targets and the interim anticipated condition/performance (*i.e.*, 2-year and 4-year targets) toward those longer-term performance expectations. The FHWA recognizes the importance of considering a longer time horizon for planning and programming projects that considers and evaluates temporal tradeoffs between feasible improvements for more efficient and effective investment decisions. The FHWA strongly recommends that State DOTs and MPOs consider longer time horizons, which look beyond 4 years (*i.e.*, multiple performance periods), for planning and programming of projects so identification and selection of those projects is guided by the longer term performance expectations. As indicated above, the purpose of the performance period is simply to measure and evaluate condition/performance, which

should not be assumed to be a “planning, programming, project delivery, data collection, data reporting” cycle of individual improvement projects or a program of projects. Thus, the performance period and LRP cycles look at different periods of time and do not have to be aligned to be effective. For these reasons, FHWA believes that the performance period does not need to be aligned with the current LRP cycles of State DOTs and MPOs. Therefore, FHWA retains the intent of the proposed language in sections 490.105(e)(4) and (e)(5) in the final rule. In sections 490.105(e)(4)(iii) and (e)(4)(iv), FHWA added the phrase “for the measures in paragraphs (c)(1) through (c)(3) of this section” to codify the specific measures being discussed. This addition does not change the intent of the paragraph.

#### Discussion of Section 490.105(e)(5) State DOT Reporting

Because there were no substantive comments on section 490.105(e)(5), FHWA made no changes.

#### Discussion of Section 490.105(e)(6) Target Adjustment

The FHWA proposed that State DOTs may adjust their established 4-year targets when they submit their Mid Performance Period Progress Report (described in section 490.107(b)(2)). This language recognizes that State DOTs would need to consider many factors in establishing targets that could impact progress, such as uncertainties in funding, changing priorities, and external factors outside the control of State DOTs. This target adjustment allowance is limited to the Mid Performance Period Progress Report, and is not allowed at any other time during the performance period. In the NPRM, FHWA expressed that this frequency of adjustment allows a State DOT to address changes they could not have foreseen in the initial establishment of 4-year targets while still maintaining a sufficient level of control in the administrative procedure necessary to carry out program requirements in an equitable manner. The MPOs impacted by a State DOT’s adjustment of targets have the option to adjust their target by either: (1) Agreeing to plan and program projects so that they contribute toward the adjusted State DOT target for that performance measure or (2) committing to a new quantifiable target for that performance measure for its metropolitan planning area when a State DOT adjusts their target, as described in section 490.105(f)(7). The Metropolitan Transportation Commission expressed

<sup>32</sup> FHWA (2015) analysis results have been included in the Docket with the filename “NHS Bridge Condition Changes 2015 09 29.”

<sup>33</sup> NPRM Comment FHWA-2013-0053-0161: <https://www.regulations.gov/document?D=FHWA-2013-0053-0161>.

<sup>34</sup> 23 U.S.C. 135(f).

<sup>35</sup> 23 U.S.C. 119(e).

their support for the proposed approach and stated that the “flexibility of revising targets in mid-stream will improve the ability of State DOTs and MPOs to more accurately predict future performance achievement.” The Illinois DOT expressed their desire for FHWA to retain the language in section 490.105(e)(6). However, the Center for American Progress and Transportation for America opposed the proposed language by stating that the proposed rule provides State DOTs with too much flexibility when establishing performance management targets and recommended that the rule should not allow State DOTs to adjust targets. Transportation for America stated that section 490.105(e)(6) is “directly against the intent of Congress for the nation’s performance management program to increase accountability and transparency of the Federal-aid highway program and improve project decision making through performance-based planning and programming.” They added that section 490.105(e)(6) “provides State DOTs blanket approval to amend their self-established targets after just 2 years without any criteria” and amending self-established targets is “unnecessary and contradictory to congressional intent.”

The AASHTO and the State DOTs of Connecticut, Missouri, Oklahoma, and Oregon recommended that State DOTs should be allowed to adjust targets annually. The South Dakota DOT stated that MAP-21 clearly provides that individual State DOTs establish their own targets. However, they believe that

the proposed rule suggests that FHWA can restrict State DOTs’ authority to establish targets, notably as to when targets can be revised. They added that FHWA “must fully respect a State’s authority to set and revise targets.”

The FHWA disagrees with the comment made by Transportation for America that its approach is “unnecessary and contradictory to congressional intent” and may reduce accountability and transparency of the Federal-aid highway program. As stated previously, the language in section 490.105(e)(6) is a result of FHWA’s recognition that State DOTs have to consider many factors in establishing targets that could impact progress such as uncertainties in funding, changing priorities, and external factors outside the control of State DOTs.

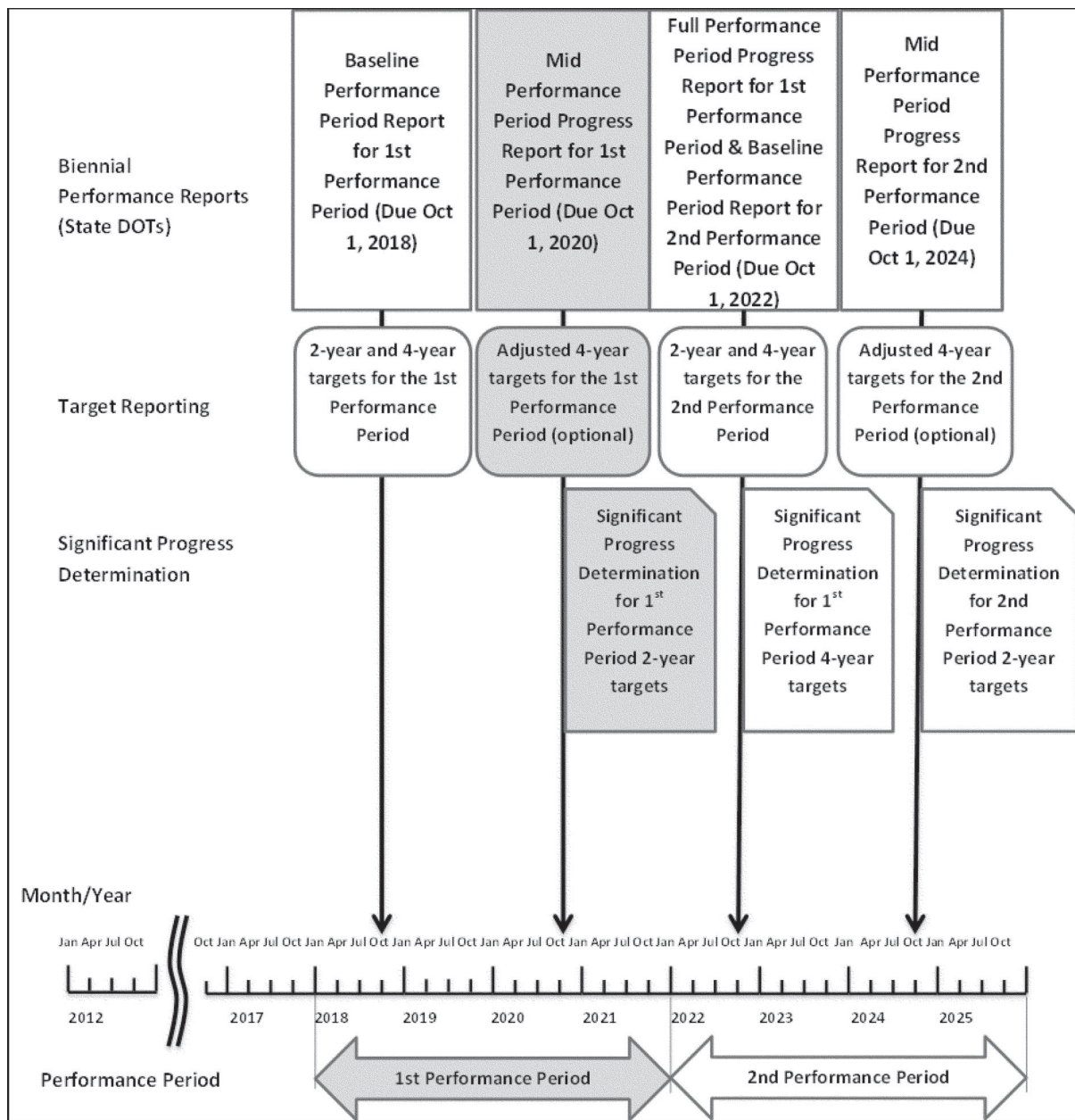
Although the flexibility of adjusting target is granted, FHWA does not believe this approach reduces the accountability associated with targets and transparency in adjusting targets. First, as stated previously, the target adjustment allowance is limited to the Mid Performance Period Progress Report and not allowed at any other time during the performance period.

Second, the 4-year target adjustment through the Mid Performance Period Progress Report will provide a more consistent method for significant progress determinations under section 490.109. The FHWA felt it is necessary to provide State DOTs the same opportunity to make significant progress for 4-year targets as for the 2-year targets. As shown in Figure 2 below,

both 2-year and 4-year targets for the first performance period are reported to FHWA by October 1, 2018. Those 2-year targets will be subjected to a significant progress determination under section 490.109 after the Mid Performance Period Progress Report is submitted on October 1, 2020. Therefore, for the 2-year targets, the duration between target reporting and significant progress determinations is about 2 years. However, for 4-year targets, the duration between target reporting and significant progress determination is about 4 years because the targets are reported on October 1, 2018, and the significant progress determination will be made after the Full Performance Period Progress Report is submitted on October 1, 2022. Allowing the adjustment of the 4-year target in the Mid Performance Period Progress Report provides the opportunity to make the duration between target reporting and significant progress determination about 2 years, which is consistent with 2-year targets.

Third, this rule includes section 490.107(b)(2)(ii)(E) which requires State DOTs to include in their Mid Performance Period Progress Report a discussion on the basis for the adjustment and how the adjusted target supports expectations documented in longer range plans (*e.g.*, the State asset management plan and the long-range statewide transportation plan).

Finally, a State DOT’s discussion on targets and adjustment will be available on a public Web site to ensure transparency and accountability in the process.



**Figure 2 – State DOT Target Adjustment in Mid Performance Period Progress Report**

The MAP-21 gives FHWA the discretion to establish requirements for targets such that any targets a State DOT establishes will achieve the overall requirements of the program. The FHWA believes State DOTs have the authority and flexibility to establish targets for the performance measures. However, contrary to South Dakota DOT's comment, FHWA does not believe MAP-21 provides State DOTs the authority to adjust or revise targets at their discretion. Instead, FHWA believes that the statute provides FHWA the authority to establish requirements for targets. The FHWA feels that some

requirements must be established so that accountability and transparency are instilled in the performance management process. The FHWA also believes that these requirements for targets are consistent with six<sup>36</sup> of the

<sup>36</sup> Six of the Nine principles used in the development of proposed regulations for target establishment criteria: [www.regulations.gov](http://www.regulations.gov), Docket FHWA-2013-0053:

- Ensure for Consistency—provide a sufficient level of consistency, nationally, in the establishment of measures, the process to set targets and report expectations, and the approach to assess progress so that transportation performance can be presented in a credible manner at a national level.

- Increase Accountability and Transparency—consider an approach that will provide the public and decision makers a better understanding of Federal transportation investment needs and return on investments.
- Consider Risk—recognize that risks in the target establishment process are inherent, and that performance can be impacted by many factors outside the control of the entity required to establish the targets.
- Understand that Priorities Differ—recognize that State DOTs and MPOs must establish targets across a wide range of performance areas, and that they will need to make performance trade-offs to establish priorities, which can be influenced by local and regional needs.
- Recognize Fiscal Constraints—provide for an approach that encourages the optimal investment of Federal funds to maximize performance but



nine principles listed in the NPRM preamble that were considered in the development of the proposed regulation.

The biennial reporting cycle, as shown in Figure 2 above, has the appearance of only allowing State DOTs to incorporate uncertainties 2 years in advance. However, as shown in Figure 2 above, the actual duration (*i.e.*, from Mid Performance Period Progress Report due date, October 1, to the end of the performance period) State DOTs have to incorporate uncertainties is shorter than 2 years. For example, as shown in Figure 2, the 4-year target established in 2018 (the first State Biennial Performance Report) may be adjusted in 2020 (the second State Biennial Performance Report due on October 1, 2020). Note that the 4-year target for the first performance period is the anticipated condition/performance level at the end of each performance period (December 31, 2021). As discussed in section 490.105(e)(4), 4-year targets would reflect the programmed improvement projects anticipated to be delivered, and their condition/performance to be measured, by the end of that performance period. Therefore, FHWA believes that target adjustment, in October 2020 for the anticipated condition/performance as of December 2021, provides State DOTs a sufficient level of control in the administrative procedure necessary to carry out these program requirements in a reasonable manner. Note that duration from October 2020 to December 2021 is 15 months, not 2 years.

Annual target adjustment, as suggested by AASHTO and others, would be adjusting the 4-year target (the anticipated condition/performance as of December 2021) during calendar year 2021. The FHWA believes the transparency of target and the target establishment process will be compromised if targets are allowed to be adjusted close to the end of the assessment period. Therefore, FHWA retains the language in section 490.105(e)(6) that allows State DOTs to only adjust their established 4-year targets when they submit their Mid Performance Period Progress Report.

In the NPRM, FHWA proposed that, if an MPO had originally agreed to accept the State DOT's targets and the State DOT adjusts them, the MPO would need to revisit its targets. Several MPOs and

recognize that, when operating with scarce resources, performance cannot always be improved.

- Provide for Flexibility—recognize that the MAP-21 requirements are the first steps that will transform the Federal-aid highway program to a performance-based program and that State DOTs, MPOs, and other stakeholders will be learning a great deal as implementation occurs.

MPO associations, including NARC and TEMPO, argued that the final rule should explicitly state that when a State DOT chooses to adjust targets, an MPO is not required to also adjust its own established targets. The commenters suggested that a State DOT should be required to coordinate with the MPO if the State DOT adjusts its targets, just as State DOTs are required to do when establishing initial targets. The TEMPO recommended that any target adjustments proposed by a State DOT that directly impact an MPO's planning area should be made jointly with the MPO. The FHWA agrees with these comments to implement the target selection coordination requirements under 23 U.S.C. 135(d)(2)(B)(i)(II). Therefore, FHWA added language in section 490.105(e)(6) that if a State DOT decides to adjust their 4-year targets then it must coordinate with relevant MPOs.

#### Discussion of Section 490.105(e)(7) Phase-in Requirements for Interstate Pavement Measure

In the NPRM, FHWA recognized that some State DOTs may not be able to meet all data requirements in section 490.309(b)(1) prior to the start of the first proposed performance period for the Interstate System pavement condition measure. As a result, FHWA proposed the following for the measures in section 490.307(a)(1) and (a)(2) in the NPRM:

- State DOTs establish their 4-year targets and report these targets in their Baseline Performance Period Report, required under section 490.107(b)(1);
- State DOTs are not required to report 2-year targets and baseline condition/performance in their Baseline Performance Period Report; and
- State DOTs update the baseline condition/performance in their Baseline Performance Period Report, with the 2-year condition/performance in their Mid Performance Period Progress Report, described in section 490.107(b)(2)(ii)(A). Also, State DOTs may adjust their 4-year targets, as appropriate.

The State DOTs of Maine, New Hampshire, and Vermont commented that the phase-in process for the Interstate pavement condition proposed in the NPRM only relieves State DOTs from reporting baseline condition and 2-year targets, but ignores all other new requirements. They commented that establishing both 2 and 4-year targets will require the same baseline data. They questioned whether relieving only the 2-year target was an oversight in the NPRM, and if FHWA should also delay the establishment of 4-year targets. They

requested additional clarification and guidance on how to establish 4-year targets in the absence of baseline condition data. The New Jersey DOT made a similar comment stating that it is impractical to establish and report 4-year targets in the absence of baseline condition information and requested clarification of the requirement to report 4-year targets when a baseline condition/performance reporting is not required. Texas DOT stated that establishing the targets will be challenging since some State DOTs may not have historical information for some of the metrics in this rule and requested guidance on how these measures could be phased in along with new metrics.

During the development of the NPRM, FHWA considered numerous ways for State DOTs to meet the target and progress reporting requirements under the 23 U.S.C. 150(d)(1) and 150(e), which require State DOTs to establish the first set of performance targets one year after the effective date of the final rule and to report those targets not later than October 1, 2016.<sup>37</sup> The FHWA felt at the time of the development of the NPRM that some State DOTs may not be able to meet the new data reporting requirements for Interstate pavement condition, as provided in section 490.309(b)(1), until after the start of the first proposed performance period. The FHWA had to consider how State DOTs could meet the statutory requirements. The FHWA also realized that those State DOTs would encounter difficulties in establishing 4-year targets without sufficient data or the baseline condition/performance for Interstate pavement condition measure for the first performance period. Therefore, FHWA allowed State DOTs to estimate their initial 4-year target. This would be done with the understanding that State DOTs would not have baseline condition when the target was first established and State DOTs would be provided an opportunity to adjust their estimated 4-year target through Mid Performance Period Progress Report 2 years later. Their actual 2-year condition in the Mid Performance Period Progress Report would become the baseline condition for the first performance period.

The FHWA has considered the comments and examined State DOTs' ability to implement the data requirements in section 490.309(b)(1) for the Interstate pavement measures with respect to the updated implementation timeline in Figure 2 above. As provided in section 490.309(a), the first data collection cycle

<sup>37</sup> "4 years after the date of enactment of the MAP-21" stipulated in 23 U.S.C. 150(e).

(1-year cycle) will be in calendar year 2018. Therefore, assuming this final rule is effective in calendar year 2016, some State DOTs will not have the baseline conditions for Interstate pavement measures at the time of target reporting in Baseline Performance Period Report in calendar year 2018. The FHWA understands that it will be difficult to estimate targets without the baseline condition data for some State DOTs. However, State DOT target establishment “not later than 1 year of the effective date of this rule” in section 490.105(e)(1) is a statutory requirement under 23 U.S.C. 150(d). Therefore, to meet the statutory mandate, FHWA cannot delay the due date of State DOT target establishment. Therefore, as stated above, FHWA has allowed State DOTs to estimate their initial 4-year target. This would be done with the understanding that State DOTs would not have baseline condition when the target is first established and State DOTs would be provided an opportunity to adjust their estimated 4-year target through Mid Performance Period Progress Report 2 years later. Their actual 2-year condition in the Mid Performance Period Progress Report would become the baseline condition for the first performance period. Therefore, FHWA retains the phase-in requirements for Interstate pavement measure in section 490.105(e)(7) as proposed in the NPRM.

#### Discussion of Section 490.105(f) MPO Targets

Section 490.105(f) describes MPO requirements for the establishment of targets for all measures identified in section 490.105(c). The MPOs are required to implement the 23 U.S.C. 134(h)(2)(B) target establishment provisions in a manner that provides for a level of consistency necessary to evaluate and report progress at both the national and MPO level.

#### Discussion of Section 490.105(f)(1) MPO Target Schedule

To meet the statutory requirements in 23 U.S.C. 134(h)(2)(C), section 490.105(f)(1) requires each MPO to establish 4-year targets no later than 180 days after the relevant State DOT establishes its targets.

As discussed in the combined discussion for sections 490.105(e)(1) and 490.105(f)(1), FHWA recognizes that the level of effort and required coordination for selecting performance targets is substantial and takes time. However, to meet the statutory requirements in 23 U.S.C. 134(h)(2)(C), FHWA retains the language in section 490.105(f)(1).

In the NPRM, FHWA attempted to develop these target establishment requirements so that they could be met by all MPOs. Recognizing that MPOs vary in size, capability, resource availability, and ability to establish performance targets, FHWA proposed that they only be required to establish 4-year targets and have target establishment options, as provided in section 490.105(f)(4) of the NPRM (section 490.105(f)(3) of the final rule). The FHWA proposed MPO target establishment options: (1) Agreeing to plan and program projects so that they contribute toward the accomplishment of the relevant State DOT targets or (2) committing to quantifiable targets for their metropolitan planning area.

The NARC expressed their appreciation for FHWA’s recognition of the burden an MPO faces in establishing targets and not requiring them to establish 2-year targets. However, Transportation for America stated that this rule lacks consistency as State DOTs are required to establish both a 2-year and 4-year targets while MPOs are only required to establish 4-year targets. The FHWA considered these comments and determined that because MPOs vary in capability, resources, and their ability to establish performance targets it is important that the measures be structured in a way that allows all MPOs to meet the requirements in this rule. The FHWA retains the proposed language in NPRM section 490.105(f)(1)(i), in the final rule.

Section 490.105(f)(1)(ii) is reserved.

The FHWA retains the language of section 490.105(f)(2), as proposed in the NPRM. (See discussion for section 490.105(e)(2).)

The FHWA deleted the language in section 490.105(f)(3) of the NPRM because this paragraph is redundant with what is already in section 490.105(f)(1). Subsequent paragraphs in section 490.105(f) were renumbered in the final rule.

#### Discussion of Section 490.105(f)(3) and (4) MPO Target Establishment Option and MPOs Serving a Multistate Metropolitan Planning Area

In the NPRM, FHWA proposed MPO target establishment options that would provide for a level of consistency necessary to evaluate and report progress at an MPO level, while providing for a degree of flexibility to support metropolitan planning needs. The FHWA also attempted to develop these target establishment requirements so that they could be met by all MPOs, recognizing that MPOs vary in capability, resource availability, and ability to establish performance targets.

Therefore, FHWA proposed in section 490.105(f)(4) that MPOs would establish targets specific to the metropolitan planning area by either: (1) Agreeing to plan and program projects so that they contribute toward the accomplishment of the relevant State DOT targets, or (2) committing to quantifiable targets for their metropolitan planning area. The proposed language gave MPOs two options to establish targets. The MPOs could establish their own quantifiable targets. Alternatively, recognizing that the resource level and capability of some MPOs to reliably predict performance outcomes varies across the country, FHWA proposed an approach that would allow MPOs that did not want to establish their own quantifiable target to establish targets by supporting State DOT targets for performance. The FHWA also stated in the NPRM that regardless of which option MPOs choose to establish targets, MPOs may need to work with relevant State DOTs to coordinate, plan, and program projects for their planning area.

The NARC expressed their appreciation for the flexibility provided in section 490.105(f)(4) of the NPRM (section 490.105(f)(3) in the final rule), which gives an MPO target establishment options. Moreover, they supported flexibility that emphasizes local transportation priorities in establishing targets and allows MPOs to establish targets that represent a decline in pavement or bridge conditions, if dictated by local priorities. The Connecticut DOT, Mid America Regional Council, and NYSAMPO expressed their support for the proposed MPO target establishment options. However, the Center for American Progress opposed the options, stating that MPOs should be required to establish quantitative performance targets.

The Northeast Ohio Areawide Coordinating Agency stated that if State funds are distributed with a focus on improving capacity, MPOs should have the freedom to establish regional targets that are realistic to the level of funding an MPO receives for maintenance separate from the State DOT goals. The Iowa DOT suggested FHWA should consider a waiver process by which the performance monitoring requirements for MPOs in those States where State DOTs hold sole programming authority over the State’s NHPP funding allocation. This would effectively eliminate the MPOs’ ability to impact the NHPP. The Connecticut DOT commented that many of the smaller MPOs do not currently have the resources to collect and analyze this data so this is likely to put additional

burdens on State DOTs. They advocated that any MPO electing to establish their own targets should be required to collect and analyze whatever data is needed to support their plan, if that data is not already available from State DOT or other entities. Because FHWA believes that MPOs vary in size, capability, resources, and ability to establish performance targets, FHWA disagrees with the Center for American Progress's comment to require that MPOs only be allowed to establish quantifiable targets. The FHWA believes that performance management practices will continuously improve as State DOTs and MPOs implement the requirements under this rule. The FHWA anticipates that more MPOs will be able to establish their own quantitative targets in the future as the performance management practices mature.

In response to the comments from Northeast Ohio Areawide Coordinating Agency and Iowa DOT, FHWA emphasizes that regardless of who controls funds or programming authority, coordination in target selection is required under 23 U.S.C. 135(d)(2)(B)(i)(II) and 23 U.S.C. 134(h)(2)(B)(i)(II). (See the discussion section for sections 490.105(e)(2) and 490.105(f)(2) for more details on target selection coordination requirements.)

In response to Connecticut DOT's comment, FHWA notes that the pavement condition measures in subpart C are applicable to the mainline highways on the Interstate System and on the non-Interstate NHS. The bridge condition measures in subpart D are applicable to bridges carrying the NHS, which includes on- and off-ramps connected to the NHS. This is consistent with the statutory provisions in 23 U.S.C. 150(c)(3). Therefore, the applicable network for State DOTs and MPOs within that State are not mutually exclusive. The data collection and analysis must be done by State DOTs and MPOs in a coordinated manner, as required in 23 CFR 450.208.

The FHWA considered the comments on MPO target establishment options and retains in the final rule the proposed options with minor revision in section 490.105(f)(4) of the NPRM (section 490.105(f)(3)). The revision is to clarify that an MPO can exercise different target establishment options for each measure in subparts C and D, and that they do not have to select the same option for all measures in subparts C and D. The FHWA amended section 490.105(f)(4) so that MPOs shall establish a target by either: (1) Agreeing to plan and program projects so that they contribute toward the

accomplishment of the relevant State DOT target for that performance measure, or (2) committing to a quantifiable target for that performance measure for their metropolitan planning area.

The New Jersey DOT commented that multi-state MPOs should have the discretion to establish different targets for each State. In response to the comment, FHWA added section 490.105(f)(4) to address situations where metropolitan planning areas extend across multiple States. As discussed in section 490.105(f)(3), MPOs have an option for establishing a target by either: (1) Agreeing to plan and program projects so that they contribute toward the accomplishment of the relevant State DOT targets, or (2) committing to quantifiable targets for their metropolitan planning area. The added language in section 490.105(f)(4)(i) provides MPOs the option to choose different target establishment options, as specified in section 490.105(f)(3), for the portion of the metropolitan area within each State. For example, if a metropolitan planning area of an MPO is located within two States (*e.g.*, "State A" and "State B"), that MPO could establish their target for a measure by: (1) Agreeing to plan and program projects so that they contribute toward the accomplishment of the State A target for the portion of metropolitan planning area within State A; and (2) committing to quantifiable target for the portion of their metropolitan planning area within State B. The language in section 490.105(f)(4)(ii) clarifies that if an MPO chooses the option to "agree to plan and program projects to contribute toward State targets" for the entire metropolitan planning area, then they must plan and program projects in support of the individual State DOT targets as applicable to the portion of the metropolitan area within each State.

Although MPOs could exercise their target establishment options provided in section 490.105(f)(3) and (4), FHWA emphasizes that all MPOs are required to coordinate with relevant State DOTs in MPO target establishment regardless of which options MPOs choose in target establishment.

Sections 490.105(f)(5) and 490.105(f)(6) are reserved.

#### Discussion of Section 490.105(f)(7) MPO Response to State DOT Target Adjustment

The FHWA proposed MPO response options to State DOT target adjustment, described in section 490.105(e)(6), through the State DOT's Mid Performance Period Progress Report. This MPO response option was only for

those MPOs who established their targets by agreeing to plan a program of projects so that they contribute to the adjusted State DOT target for a performance measure, as provided in section 490.105(f)(4)(i) of the NPRM (section 490.105(f)(3)(i) of the final rule). Those MPOs responding to State DOT target adjustment have the following options: (1) Agreeing to plan and program projects so that they contribute toward the accomplishment of the relevant State DOT targets, or (2) committing to quantifiable targets for their metropolitan planning area.

The NARC made a comment that the rule should explicitly state that when a State DOT chooses to adjust its targets, an MPO is not required to also adjust its own established targets. The FHWA believes that the language in this rule does not require MPOs to adjust their own quantifiable target when State DOTs adjust their targets. The FHWA feels that it is not necessary to explicitly state this in the final rule. The FHWA retains the proposed MPO response options with minor revisions in section 490.105(f)(7). The revision is to clarify that MPOs can exercise different target establishment options for each measure in subparts C and D, and that they do not have to select the same option for all measures in subparts C and D. The FHWA amended section 490.105(f)(7) to read that MPOs shall respond to State DOT target adjustment by either: (1) Agreeing to plan and program projects so that they contribute toward the accomplishment of the relevant State DOT target for that performance measure, or (2) committing to a quantifiable target for that performance measure for their metropolitan planning area. Although MPOs could exercise their target selection options provided in section 490.105(f)(7), FHWA emphasizes all MPOs are required to coordinate with relevant State DOTs in target selection, as required in section 490.105(f)(3), regardless of which option MPOs choose in target selection.

#### Discussion of Section 490.105(f)(8) MPO Target Adjustment

The Texas DOT commented that "if the proposed rules are adopted as drafted, Texas State DOT will need to work with TEMPO and their MPOs and transit providers to amend all existing Metropolitan Planning Agreements to include language regarding performance planning, measures, targets, etc." They added that this is going to become "even more important in light of the new OMB Super Circular and the potential need to make changes to the Metropolitan Planning Agreements based on new regulations in 2 CFR 200." The Texas



DOT commented that “this requirement is a significant task, and State DOTs and MPOs should be given the greatest degree of latitude and flexibility in making these revisions on a schedule of their own choosing without penalty.”

The NYMTC commented that this rule requires State DOTs and MPOs to document procedures for reporting, target setting, target adjustment, and related coordination in metropolitan planning agreements. The NYMTC commented that they object to the use of metropolitan planning agreements for this purpose. In lieu of the metropolitan planning agreements, they recommended maximum flexibility for State DOTs and MPOs in establishing the coordination that is appropriate to each State and region. They argued that MPOs and State DOTs should not have to revisit the metropolitan planning agreements each time they make an adjustment to targets or related data collection and performance reporting procedures.

The comment from Texas DOT on metropolitan planning agreement requirements is beyond the scope of this rule. (See 23 CFR 450.314 for details on metropolitan planning agreement requirements.)

Addressing NYMTC’s comments, FHWA amended the language in section 490.105(f)(8) to remove the requirement to document the target adjustment process in the metropolitan planning agreement. The manner in which targets will be adjusted is to be mutually agreed upon by State DOTs and MPOs. This change is consistent with numerous comments received on this rule and the Planning Rule. As noted in the discussion of section 490.107(c)(1) on MPO reporting, amending the metropolitan planning agreement as part of the performance management process is onerous and does not provide the flexibility needed. This change is also intended to emphasize the need for State DOTs and MPOs to coordinate when adjusting targets, just as they are to do when establishing targets. (See discussion section for section 490.107(c)(1) for more information.)

No substantive comments were received for section 490.105(f)(9). The FHWA retains the language in section 490.105(f)(9) as proposed.

#### Discussion of Section 490.107 Reporting on Performance Targets

Section 490.107 deals with the biennial performance reporting schedule and requirements. The Montana DOT commented that, with multiple rulemakings underway and more planned in the future, FHWA should coordinate the reporting

deadlines for all of the rules that fall under this title. This will reduce the burden on States and allow reasonable process development timeframes.

As outlined in section 490.107, FHWA notes that reporting timeframes will be coordinated to the maximum extent practicable.

The New York DOT submitted a comment expressing their support for the provision that requires that only State DOTs report to FHWA on performance targets and progress in achieving established targets.

#### Discussion of Section 490.107(a)(1)–(2) General Reporting on Performance Targets

The North Carolina DOT commented that the use of three different reports and the associated requirements is unduly complex. They suggest that since the data is being submitted to HPMS and NBIS, FHWA should extract and use the information to meet the reporting requirements.

The FHWA clarifies that performance metric data is completely different from performance target, condition/performance, progress evaluation, etc. The FHWA felt it is necessary to differentiate the two in this rule because metric data refers to IRI, Cracking Percent, rutting, and faulting values for pavement sections reported to HPMS and NBI Data Items 58-Deck, 59-Superstructure, 60-Substructure, and 62-Culverts). These reported metric data are not performance measures and they do not represent performance targets. Section 490.107 in this rule deals with reporting targets, condition/performance, progress evaluation, etc. and they are also required under 23 U.S.C. 150(e). For this reason, FHWA retains section 490.107(a)(1) and 490.107(a)(2) as proposed in the NPRM.

#### Discussion of Section 490.107(a)(3) Electronic Reporting Template

The FHWA retains the language in section 490.107(a)(3) that states an electronic template, provided by FHWA, will be used for State DOT reporting. Comments from the AASHTO, Connecticut DOT, Iowa DOT, Missouri DOT, New York DOT, Oklahoma DOT, Oregon DOT, PSRC, Texas DOT, and Washington DOT expressed their support for an electronic template. They wanted State DOTs to be included in the development of the product and given time to review and comment on the requirements to ensure it is not an undue burden to report the data.

The FHWA will invite the public to attend demonstrations of the reporting tool and plans to solicit comments on the reporting tool during this

demonstration. The FHWA will consider comments received on the electronic reporting template.

The New York State DOT commented that FHWA should minimize additional requirements by allowing States and MPOs to work within existing processes, to the extent possible, without imposing onerous reporting requirements or requiring significant adjustment to existing legal documentation. The FHWA notes that development of an electronic reporting template is intended to aid in streamlining the reporting process.

#### Discussion of Section 490.107(b)(1)(i) Baseline Performance Period Report Schedule

The FHWA received comments on the proposal to require submission of the first Baseline Performance Period Report on October 1, 2016, in section 490.107(b)(1)(i). Comments from Washington DOT and Alaska DOT&PF noted that the proposed 2016 due date would not allow the time required by MAP-21 to establish targets. The Seattle DOT noted this as well, but asked that all deadlines be removed and State DOTs be allowed to conduct an extensive comment and revision process without a specific deadline.

The statute established target establishment and reporting deadlines for State DOTs and MPOs. The FHWA cannot change statutory deadlines. Accordingly, because this rule is being issued and effective after October 1, 2016, FHWA issued guidance on the State DOT report due on October 2016 to advise State DOTs how to comply with the statutory deadline for the first performance reporting under 23 U.S.C. 150(e). Please see discussion section for sections 490.105(e)(1) & (f)(1) for more on the FHWA issued guidance. Considering the comments received on this section, and the requirements in sections 490.105(e)(1) and 490.105(f)(1) (requiring establishment of State DOT targets within 1 year of the effective date of each final rule and MPO targets to be established within 180 days of State targets), FHWA amended the implementation timeline in section 490.107(b)(1)(i). The FHWA amended the due date of the first Baseline Performance Period report from October 1, 2016, to October 1, 2018.

With the revision to section 490.107(b)(1)(i), the first Baseline Performance Period Report is now due October 1, 2018, which is a delay of 2 years. Due to this change, the related performance period discussed in section 490.105(e)(4)(i) will also be delayed 2 years and begin on January 1, 2018. State DOTs and MPOs will still be

required to establish targets by the date specified in sections 490.105(e)(1) and 490.105(f)(1). A timeline for Biennial Performance Reports is shown in Figure 1 in section 490.105(e)(1).

#### Discussion of Section 490.107(b)(1)(ii)(A) and (C) Baseline Performance Period Report Content

The North Dakota DOT commented that the reporting requirements in section 490.107 were too detailed and that the use of the phrase “to the maximum extent practicable” opens the door to an unconstrained demand on State DOTs with possibilities of abuse. They added that documents such as the long-range statewide transportation plan are already required to document the measures, targets, and financial plans.

The FHWA disagrees with the comment from the North Dakota DOT. The FHWA has identified the minimum reporting requirements in section 490.107 needed to establish a performance management program that meets the intent and requirements of MAP-21, and allows for the discussion of performance management at a national level. The FHWA believes a set of minimum reporting requirements are necessary to provide a sufficient level of consistency in the report and the approach to assess progress, so that transportation performance can be presented in a credible manner at a national level. The FHWA also believes that the requirements in section 490.107 provide the public and decisionmakers a better understanding of Federal transportation investment needs and return on investments, thereby increasing accountability and transparency in the performance management process. The FHWA used the phrase “to the maximum extent practicable” in section 490.107(b)(1)(ii)(A) and (C) where State DOTs are required to include discussions for the basis for each established target and their relationship with other performance expectations (in longer range plans, such as the State asset management plan or the long-range statewide transportation plan). The FHWA believes these descriptions are necessary for State DOT justifications to the public and decisionmakers on how their targets are derived. The FHWA reiterates that the statutory language in MAP-21 provides that State DOTs have the ability to establish their own targets but does not provide FHWA the authority to approve or reject State DOT established targets. The FHWA believes more detailed and defensible explanations will benefit the public, decisionmakers, and State DOTs. The FHWA retains the language in

section 490.107(b)(1)(ii)(A) and (C) in the final rule.

#### Discussion of Section 490.107(b)(1)(ii)(C) and 490.107(b)(2)(ii)(C) Relationship With Other Performance Expectations in Baseline Performance Report and Investment Strategy Discussion in the Mid-Period Performance Report

Sections 490.107(b)(1)(ii)(C) (Relationship with other performance expectations in Baseline Performance Report) and 490.107(b)(2)(ii)(C) (Investment strategy discussion in the Mid-Period Performance Report) outline the requirements to discuss the link between the performance management targets, other plans, and the effectiveness of the investment strategies documented in the State asset management plan. The AASHTO, Alaska DOT&PF, and Connecticut DOT commented that these requirements should be removed as they are “duplicative and excessive reporting requirements,” and open the “door to an unconstrained demand on State DOTs for information and discussion.” They also commented that the existing documents, such as the long-range Statewide transportation plan and STIP, have requirements to document measures, targets, financial plans, and how the projects support program goals. The North Carolina DOT commented that the mid-period discussion of the State asset management plan could be excessive. The North Carolina DOT asked if this discussion is to be a one-time occurrence or occur in each mid-period report.

As discussed above for section 490.107(b)(1)(ii)(A) and (C), FHWA believes minimum reporting requirements are necessary to provide a sufficient level of consistency, in the expectations and approach, to assess progress so that transportation performance can be presented in a credible manner at a national level. The FHWA also believes that the requirements in section 490.107 provide the public and decisionmakers a better understanding of Federal transportation investment needs and return on investments, thereby increasing accountability and transparency in the performance management process. The FHWA does not agree that the items to be reported in the biennial performance reports are duplicative from the State asset management plan, long-range statewide transportation plan, STIP, or others. Although plans and reports support performance management implementation and the performance targets in section 490.105, the biennial performance reports under this rule are

updates of performance information every 2 years, but the long-range statewide transportation plan and STIP are required as part of planning process. Moreover, FHWA believes that it will be very difficult for the public and decisionmakers to obtain performance information by searching through various plans (e.g., State asset management plan, long-range statewide transportation plan, STIP, and others). The FHWA believes that the minimum reporting requirements under section 490.107 will facilitate public access to performance information in a consistent cycle for all State DOTs, thereby increasing accountability and transparency and helping to facilitate the presentation of transportation performance at a national level. Therefore, FHWA retains the language in sections 490.107(b)(1)(ii)(C) and 490.107(b)(2)(ii)(C), as proposed in the NPRM. The reporting requirements are focused on the impacts of performance management. Including this information within the reports from all State DOTs and on the same timeline will aid in the creation of a national performance story.

#### Discussion of Section 490.107(b)(1)(ii)(D) Urbanized Area Boundaries and Population Data for Targets

The FHWA proposed in section 490.313(b)(1) that thresholds for IRI rating determination (Good, Fair, or Poor) would be different among the pavement sections located within and outside of the urbanized areas with a population greater than 1 million. In the case of urbanized area boundary changes during a performance period, FHWA proposed that State DOTs declare and describe the urbanized area in their Baseline Performance Period Report at the beginning of each performance period so that the IRI rating determinations could be done consistently throughout the performance period. The FHWA revised section 490.107(b)(1)(ii)(D) to remove the term “IRI rating determination” because the thresholds for IRI rating determination are the same regardless of the location of pavement segments. (See sections 490.103(b) and 490.313(b)(1) for further discussion.)

For section 490.107(b)(1)(ii)(D), the Florida DOT requested clarification on the use of the term “applicable urbanized areas” in regards to the NPRM language that states: “. . . State DOTs shall document the boundary extent for all applicable urbanized areas and the latest Decennial Census population data, based on information in HPMS.”

Should a State DOT choose to establish additional urbanized targets, as outlined in section 490.105(e)(3), urbanized boundary information would need to be submitted. The term “applicable urbanized areas” in section 490.107(b)(1)(ii)(D) applies to the urbanized areas for which State DOTs establish optional targets under section 490.107(e)(3). As stated above, the thresholds for IRI rating determinations in section 490.107(b)(1)(ii)(D) are no longer based on the location of pavement sections. Therefore, the urbanized areas with a population greater than 1 million will no longer apply in this paragraph. In the final rule, the term “applicable urbanized areas” in section 490.107(b)(1)(ii)(D) applies only to the urbanized areas for which State DOTs establish optional targets under section 490.105(e)(3).

#### Discussion of Section 490.107(b)(1)(ii)(E) Deleted Section

The FHWA deleted section 490.107(b)(1)(ii)(E) so State DOTs will not be required to declare or describe NHS limits for the entire performance period. The NHS limits for pavement condition measures will come from the same year’s dataset as the pavement condition metric data in HPMS. The NHS designations for bridge condition measures will come from the same year’s dataset as the bridge condition metric data in NBI. (See discussion section for section 490.105(d)(3) for more detail.)

#### Discussion of Section 490.107(b)(2)(i) Schedule

In section 490.107(b)(2)(i), FHWA has delayed the Mid Performance Period Progress Report due date by 2 years from 2018 to 2020. This was done to be consistent with the delayed start to the performance period and Baseline Performance Report, as discussed in section 490.107(b)(1)(i).

#### Discussion of Section 490.107(b)(2)(ii)(C) and (E) Investment Strategy Discussion and Target Adjustment Discussion

The NEPPP noted that the investment strategy discussion in section 490.107(b)(2)(ii)(C) specifically identifies the State asset management plan for the NHS, while the other reports do not specify the NHS. The NEPPP requested clarification on the Interstate versus NHS in each of the three reports.

In response to the comments, FHWA inserts the phrase “for NHS” after “State asset management plan” in sections 490.107(b)(1)(ii)(C) and 490.107(b)(2)(ii)(E) to clearly indicate that the State asset management plan

under required under 23 U.S.C. 119(e) is applicable to NHS. This revision is consistent with the term “State asset management plan for NHS” in sections 490.107(b)(2)(ii)(C) and 490.107(b)(3)(ii)(C). The measures in subparts C and D are applicable to the NHS. The measures in subpart C assess the condition of pavements on the NHS (which includes the Interstate System and NHS exclusive of the Interstate System). The measures in subpart D assess the condition of bridges carrying the NHS, which includes on- and off-ramps connected to the NHS.

#### Discussion of Section 490.107(b)(2)(ii)(H) NHPP Target Achievement Discussion

The FHWA amended the language by replacing the phrase “improve . . . condition” with “achieve targets,” when State DOTs describe the actions they will take required under section 490.109(f). The FHWA received a comment, discussed in section 490.109(f)(1) through (3), that the phrase “improve condition” could be perceived as a “worst-first” management practice. As discussed in sections 490.109(f)(1) through (f)(3), this revision was made to be consistent with the statutory language in 23 U.S.C. 119(e)(7).

#### Discussion of Section 490.107(b)(3)(i) Schedule

The FHWA delayed the report on the full performance period by 2 years, from 2020 to 2022. This was done to be consistent with the delayed start to the performance period and Baseline Performance Report, as discussed in section 490.107(b)(1)(i).

#### Discussion of Section 490.107(b)(3)(ii)(B) 4-year Progress in Achieving Performance Targets

The FHWA changed the phrase “. . . each established 4-year target in paragraph (b)(1)(ii)(A) or (E) of this section, . . .” to “. . . each 4-year target established in paragraph (b)(1)(ii)(A) or in paragraph (b)(2)(ii)(E) of this section.” This is an editorial change to correct the section reference in the regulatory text.

The AMPO and New Jersey DOT requested clarification on the difference between the reporting requirements in sections 490.107(b)(3)(ii)(B) and 490.107(b)(3)(ii)(E). The differences between the two are that paragraph (B) applies to all targets, including any additional (urbanized and non-urbanized area) targets in section 490.105(e)(3), but paragraph (E) applies only to the statewide NHPP targets subject to significant progress determination outlined in section

490.109. Additionally, paragraph (B) is a qualitative assessment or explanation of any reasons for differences in the actual and target values. Paragraph (E) is a summary of accomplishments (e.g., how implemented investment strategies impacted the actual condition/ performance) of State DOTs in achievement of 4-year targets for the NHPP measures. The FHWA retains sections 490.107(b)(3)(ii)(B) and 490.107(b)(3)(ii)(E) in the final rule.

#### Discussion of Section 490.107(b)(3)(ii)(G) NHPP Target Achievement Discussion

As discussed in section 490.107(b)(2)(ii)(H), FHWA amended section 490.107(b)(3)(ii)(G) by replacing the phrase “improve . . . condition” with “achieve targets” when State DOTs describe the actions they will take as required under section 490.109(f). (See discussion section for sections 490.107(b)(2)(ii)(H) and 490.109(f)(1) through (3).)

#### Discussion of Section 490.107(c)(1) MPOs Shall Report Established Targets to State DOT

The FHWA amended the language in section 490.107(c)(1) to remove the requirement to use the metropolitan planning agreement to document how MPOs shall report their established targets to their respective State DOTs. The final rule requires MPOs to report their established targets to State DOTs in a manner that is documented and mutually agreed upon by both parties.

The Mid-America Regional Council expressed support for the language in the NPRM that required the method for reporting targets be documented in the metropolitan planning agreement. However, AMPO, ARC, COMPASS, NARC, NYSDOT, NYMTC, NYSAMPO, and TEMPO objected to the proposed documentation requirement as it would require the metropolitan planning agreement to be updated. The Transportation for America’s commented that “States should form an agreed to process with all MPOs within the State.”

23 CFR 450.314(h) of the final Planning Rule provides State DOTs and MPOs options for mutually identifying the agency roles and responsibilities for performance-based planning and programming in metropolitan areas in writing, either through the metropolitan planning agreements or by some other mutually determined means. To address the received comments above and to ensure consistency between this final rule and the final Planning Rule, FHWA has removed references to the



metropolitan planning agreement from this Rule.

The Connecticut DOT and NYMTC commented that States and MPOs should have maximum flexibility and discretion in target setting. As stated in discussion for section 490.105(a), MAP-21 does not provide FHWA the authority to approve or reject State DOT or MPO established targets. The FHWA reiterates that this rule does not hinder the ability of State DOTs and MPOs to establish targets that have performance holding steady or declining.

The Memphis Urban Area MPO requested clarification on the frequency and method of reporting data to State DOTs. The FHWA did not specify a required MPO reporting process in this rule. Please refer to the 23 CFR 450.324 for the requirements for MPO system performance report in the metropolitan transportation plan.

#### Discussion of Section 490.107(c)(2) MPO System Performance Report

The FHWA retains the language in section 490.107(c)(2) that requires MPOs to report baseline condition/ performance and progress toward the achievement of their targets in the system performance report for the metropolitan transportation plan (MTP), in accordance with part 450 of this chapter and as provided in 23 U.S.C. 134(i)(2)(c). The Mid-America Regional Council expressed their support for this requirement.

The IOWA DOT, NYMTC, and NYSAMPO asked for clarification on the timing of the initial Metropolitan Transportation Plan System Performance Report, given the variability of MTP adoption schedules. The inquiries related to the MTP are outside of the scope of this rule. Those inquiries should refer to the Planning final rule.

The Iowa DOT expressed concerns with submitting the system performance report with the Long Range Transportation Plan (LRTP), which is required every 4–5 years (depending on air quality in the MPO). The Iowa DOT asked how that will line up with the 2-year reporting periods outlined in the NPRM. The Iowa DOT also commented that the NPRM sets specific dates for implementing the performance measure reporting, which may or may not align with LRTP update cycles for individual MPO agencies. The NYSAMPO commented that it is important to coordinate all of the reporting and target setting timelines for each of the performance measure rules so that State DOTs and MPOs are not burdened with numerous reporting schedules that are out of synch with one another.

Transportation for America echoed these concerns, and suggested that FHWA “ensure the performance period being proposed syncs up with the plan update cycles for State DOTs and MPOs.” The AMPO and COMPASS advised FHWA to have MPOs align their performance periods to their LRTP cycle. The TEMPO stated that each MPO should set its own individual target setting and biennial reporting timelines. The AMPO requested clarification on whether MPOs would be required to report on the same timelines as State DOTs.

It is true that the performance period and individual MPO planning cycles may not coincide, but there is no requirement that they do. At the time of MTP adoption (LRTP or MTP), the MPO would include what information it had in its system performance report and expand on the information with the next report update. In addition, MPOs can choose to adopt their MTPS before the 4–5 year requirement, and more closely align their planning cycle and the performance period cycle.

The Iowa DOT requested more detail on what will be required to report in their system performance report. The regulatory requirements of the system performance report are provided in 23 CFR part 450.<sup>38</sup> The inquiries related to the system performance report are outside of the scope of this rule. Those inquiries should refer to the Planning final rule.

#### Section 490.109 Assessing Significant Progress Toward Achieving the Performance Targets for the National Highway Performance Program

##### Discussion of 490.109(a) General

The FHWA retains the language in section 490.109(a) which makes State DOTs accountable for making progress for all pavements and bridges on the NHS regardless of ownership. The FHWA made minor clerical edits to clarify the cross-references. The AASHTO recommended that non-State DOT assets (e.g., assets owned by the Federal government, tribal governments, local agencies, and others) be excluded from the significant progress determination under section 490.109. The AASHTO and State DOTs of Connecticut, Maine, New Hampshire, Vermont, and Washington argued that State DOTs may not be legally able to collect data on non-State DOT assets and may have no authority to control how funding on those assets is spent or assets are maintained. As discussed in

<sup>38</sup> Statewide and Nonmetropolitan Transportation Planning: Metropolitan Transportation Planning (FR Vol. 81, No. 103).

section 490.105(d), FHWA is aware of a limit to the direct impact that State DOTs can have on performance outcomes for the non-State controlled assets within the State. However, as the recipients and stewards of the NHPP funds for the NHS in respective State DOTs, FHWA expects that State DOTs would consider the uncertainty and associated performance outcome of the non-State owned assets. The FHWA expects State DOTs to coordinate with the appropriate owners of the non-State controlled NHS assets in the establishment of State DOT targets.

Both the Alaska DOT&PF and the Oregon DOT suggested alternatives to the term significant progress and its definition. The Alaska DOT&PF commented that the term be redefined to mean “meet or exceed the ½ target” or the term should be removed from the rule entirely. The Oregon DOT suggested that the term significant progress be revised to “adequate” progress. However, FHWA retains the term “significant progress” in the final rule because the term is referenced in the statute (23 U.S.C. 119(e)(7)).

##### Discussion of 490.109(b) Frequency

Section 490.109(b) specifies the frequency for FHWA to determine whether a State DOT has or has not made significant progress toward the achievement of NHPP targets to be every 2 years (*i.e.*, at the midpoint and the end of each performance period) which aligns with State DOT Biennial Performance Reports in 490.107. In the NPRM, FHWA stated that it expects that during a performance period, State DOTs would routinely monitor leading indicators (*e.g.*, program delivery status) to assess if they are on track to make significant progress toward achievement of their NHPP targets. If a State DOT anticipates that it may not make significant progress, it is encouraged to work with FHWA and seek technical assistance during the performance period to identify the actions that can be taken to improve progress.

In the NPRM, FHWA sought comment on whether it should require State DOTs to more frequently (*e.g.*, annually) evaluate and report the progress they have made. The Tennessee DOT supported the 2-year cycle of significant progress determinations and added that “annual reporting would be unlikely to show significant differences in results than biennial reporting.” The Missouri DOT commented that State DOTs will have the ability to report data annually. The data should be updated in HPMS and NBI systems, but State DOTs should not be asked to submit a progress report on an annual basis. The AASHTO and

Connecticut State DOT opposed more frequent reporting and determinations.

The FHWA clarifies that FHWA did not seek comments on the frequency of FHWA significant progress determination (*i.e.*, every 2 years). Instead, FHWA requested comments on whether or not State DOTs should evaluate their condition/performance and report the progress they have made more frequently than every 2 years. Through more frequent condition/performance evaluation, State DOTs would more frequently monitor their condition/performance and have the opportunity to proactively take necessary actions make significant progress toward achievement of the NHPP targets. The FHWA appreciates the comments, but retains the biennial frequency of progress reporting in § 490.107. The FHWA strongly encourages State DOTs to routinely monitor their condition/performance so they can proactively take actions necessary to make significant progress toward achievement of the NHPP targets.

#### Discussion of § 490.109(c) Schedule

The FHWA retains the language in section 490.109(c) which says FHWA will determine significant progress toward the achievement of a State DOT's NHPP targets after the State DOT submits the Mid Performance Period Progress Report for progress toward the achievement of 2-year targets, and again after the Full Performance Period Progress Report for progress toward the achievement of 4-year targets.

The Missouri and Tennessee DOTs expressed support for the proposed timeline, noting that the necessary data is submitted annually and therefore FHWA is able to complete their assessment with the frequency they deem necessary.

The Oregon DOT requested clarification on who at FHWA will perform the assessment of significant progress.

The AASHTO and the Oregon and Connecticut DOTs recommend that FHWA inform State DOTs of their achievement of making significant progress by December 31 of the calendar year in which the assessment was made. They also recommended that the rule provide that if a State DOT does not receive that information by the deadline, then it is conclusively deemed to have made significant progress in that time period. North Carolina DOT also commented that notification should be as soon as possible.

The FHWA is committed to a timely notification of significant progress determination results to State DOTs so

they can take prompt actions, as described in section 490.109(f). The FHWA is also committed to a timely publication of determination results on the public Web site to meet the demands of the public and Congress. The FHWA clarifies that prior to its determination, State DOTs are required to report actual condition/performance in their Mid Performance Period Progress Report and Full Performance Period Progress Report, as provided in sections 490.107(b)(2)(ii)(A) and 490.107(b)(3)(ii)(A). The FHWA also clarifies that the reported actual condition/performance in sections 490.107(b)(2)(ii)(A) and 490.107(b)(3)(ii)(A) are not a qualitative assessment of performance, but they are quantitative values (*i.e.*, calculated measures). The qualitative assessment of performance is required under sections 490.107(b)(2)(ii)(B) and 490.107(b)(3)(ii)(B). With quality HPMS and NBI data from State DOTs, FHWA believes that State DOT reported condition/performance will be no different from FHWA calculated condition/performance in significant progress determination in section 490.109.

State DOTs are also required to discuss the progress they have made toward the achievement of all targets established for the NHPP measures, as described in sections 490.107(b)(2)(ii)(F) and 490.107(b)(3)(ii)(E), in the Mid Performance Period and Full Performance Period Progress Reports. The FHWA believes that through these requirements, State DOTs will be well aware of whether they will make significant progress prior to FHWA determination notification. Therefore, FHWA retains the language in section 490.109(c), as proposed in the NPRM. The FHWA plans to issue guidance clarifying when the determination notification to State DOTs will be made after publication of the final rule.

The North Carolina DOT requested clarification on whether States that failed to achieve significant progress would be able to adjust their targets. Failure to achieve significant progress does not trigger the opportunity or requirement to adjust targets. The State DOTs have the opportunity to establish or adjust targets every 2 years, as provided in sections 490.105(e)(4)(i) and (e)(4)(ii) and 490.105(e)(6), respectively. The process used by FHWA to determine significant progress is transparent. As discussed in section 490.105(e)(6), FHWA believes if targets are allowed to be adjusted more frequently, then the transparency of target and target establishment process will be compromised. The FHWA

strongly encourages State DOTs to track their significant progress on their own, and adjust targets in their Mid Performance Period Progress Report as they deem necessary.

#### Discussion of 490.109(d)(1) Through (d)(3) Source of Data/Information

In sections 490.109(d)(1) through (d)(3), FHWA proposed data extraction dates for the significant progress determination for NHPP measures. The proposed data extraction dates were:

- June 15 of the year in which the significant progress determination is made for the Interstate System pavement condition measures;
- August 15 of the year in which the significant progress determination is made for the non-Interstate NHS pavement condition measures; and
- June 15 of the year in which the significant progress determination is made for the NHS bridge condition measures.

The Oregon DOT requested a wording change from “prior year” to “most recent data collected” in sections 490.109(d)(1) and (d)(2). The commenter noted that the term “prior year” indicates that data has to be collected in the 2nd and 4th years for the non-Interstate NHS sections. They asked what if a State wants to collect this data in years 1 and 3 of the performance period. The commenter stated that the wording should be changed to allow States to use the most recent data collected as this gives the States flexibility in selecting data collection cycles to match other processes, such as STIP development, within the State.

The FHWA clarifies that the data collection frequency requirement for non-Interstate NHS pavement data is every 2 years, as described in section 490.309(b)(2). So, in this rule, there is no requirement for State DOTs to collect their pavement condition data for the entire non-Interstate NHS within a particular year. The FHWA also clarifies that biennial data collection frequency for non-Interstate NHS requires annual data reporting to HPMS making the most recent data collected replacing the data from previous data collection cycle. So, if a State DOT chooses to collect pavement data for the entire non-Interstate NHS in the first year of a performance period and collect data again for the entire non-Interstate NHS in the third year of that performance period, that State DOT will meet the requirements in section 490.309(b)(2). The FHWA believes that this approach will not hinder State DOTs from selecting their data collection cycles to match other processes. Please note that annual pavement data collection



frequency is required for the Interstate System, as described in section 490.309(b)(1). Because of the provided explanation, FHWA believes the term “prior year” is more appropriate in sections 490.109(d)(1) and (d)(2) because the term refers to the “most recent data collected and reported” in HPMS. Therefore, FHWA retains the language in sections 490.109(d)(1) and (d)(2), as proposed in the NPRM.

The FHWA did not receive any substantive comments regarding these data extraction dates but received substantive comments on the proposed data reporting dates for both pavement and bridge condition measures. Please refer to sections 490.311(c)(4) and (c)(5) and 490.411(d) for discussion of those comments. As discussed in sections 490.311(c)(4) and (c)(5) and 490.411(d), FHWA adopts the language in sections 490.109(d)(1) through (d)(3) in the final rule.

#### Discussion of 490.109(d)(4) Baseline Condition Data

The FHWA revised section 490.109(d)(4) so that the NHS limits for significant progress determination for pavement condition measures will come from the same year’s dataset as the pavement condition metric data in HPMS. The NHS designations for the significant progress determination for the bridge condition measures will come from the same year’s dataset as the bridge condition metric data in NBI. Similarly, the NHS information for the baseline conditions for significant progress determination of the targets for the pavement and bridge condition measures will come from the data contained in HPMS and NBI of the year in which the Baseline Period Performance Report is due to FHWA. (See discussion sections for 490.105(d)(3), and 490.107(b)(1)(ii)(E) for more detail.)

In addition, sections 490.313(b)(1) and (b)(2) are revised so that IRI condition ratings of Good, Fair, and Poor will no longer depend on whether a pavement section is within an urbanized area with a population greater than 1 million. Therefore, urbanized area data for significant progress determinations of pavement condition targets is no longer necessary. (See discussion sections for 490.313(b)(1) for more detail.)

#### Discussion of 490.109(e)(1) General Discussion of Significant Progress Determination for Individual NHPP Targets

The FHWA revised the language in section 490.109(e)(1) to correct a typographical error and replaced the

word “and” with “through.” The final rule reads “. . . established by the State DOT for the NHPP measures described in 490.109(c)(1) through (c)(3).” This error was noted by AASHTO and the Connecticut and Virginia DOTs.

The AASHTO and Connecticut DOT commented that significant progress should only be determined based on the required targets in section 490.105(d)(1), not any additional targets State DOTs have voluntarily chosen to establish in section 490.105(e)(3). The language in section 490.109(e)(1) of the NPRM and final Rule is consistent with this. Section 490.109(e)(1) specifically says that FHWA will not assess the progress achieved for any additional targets a State DOT may establish under section 490.105(e)(3). No change to the final rule is required.

#### Discussion of 490.109(e)(2) Significant Progress Toward Individual NHPP Targets

The FHWA retains the language in section 490.109(e)(2), which states that for each NHPP target, progress toward the achievement of the target would be considered significant when either of the following occur: (1) The actual condition/performance level is equal to or better than State DOT Baseline Performance Period Report; or (2) actual condition/performance is equal to or better than the established target. To make the comparisons in a consistent manner, the language in sections 490.313(f) and 490.409(c) includes the precision level (*i.e.*, decimal places) for the measures, which is to be calculated to the one tenth of a percent (0.1 percent). The Colorado DOT expressed their support for the 0.1 percent achievement threshold.

In the first performance measures NPRM, which addresses safety, FHWA proposed in section 490.211 of the NPRM a statistical evaluation approach for determining significant progress. Comments received on the Safety NPRM indicated that it was too complicated and seemed arbitrary. In the Final Rule for safety performance measures, FHWA changed its approach from statistical evaluation to improvement over baseline. Therefore, in this final rule, FHWA is retaining the determination methodology proposed.

The following summarizes the comments on the proposed methodology for determining significant progress. In regard to the proposed significant progress methodology, the comments from AASHTO said that “the approach must be retained in the final rule.” They also added that the approach would “give State DOTs flexibility to establish aggressive targets

if desired but will not result in States being punished if they do not meet those targets.” Missouri DOT also supports the approach as “straightforward and easy to determine.” Oregon DOT voiced their support by indicating that it is “reasonable and accommodates both increasing and decreasing pavement conditions.” Minnesota DOT expressed their support, stating that it would allow States to establish declining targets, but still achieve significant progress.

While many State DOTs did not specifically mention their support, they indicated their general support for the AASHTO’s letter in support of the proposed approach. These State DOTs included Alaska, Arkansas, Colorado, Florida, Georgia, Idaho, Maryland, Michigan, Missouri, Montana, New Jersey, North Dakota, Pennsylvania, South Dakota, and Wyoming. The support of the proposed approach was also expressed by the Metropolitan Transportation Commission and the Mid-America Regional Council.

However, some commenters expressed disagreement with FHWA’s proposed method for determining significant progress. Washington DOT and the PSRC commented that “significant change” should be based on a statistical evaluation of the data submitted by the State DOT and suggested use of the standard deviation of the data to determine the level of significance. The FHWA considered some statistical methods for significant progress determination approach during the time of preparing the NPRM. However, this option was determined to be unfeasible because the magnitude of “statistically significant change” in condition/performance would have to be an arbitrarily selected significance level. Without an established target value, determining the magnitude of “statistically significant change” was not possible. In addition, in the final rule for safety performance measures, FHWA changed its approach from statistical evaluation to improvement over baseline after receiving comments that the statistical methods were “too complex and difficult.”

The AASHTO and the Connecticut and Iowa DOTs stated that the use of 0.1 percent was arbitrary. In the discussion of section 490.109 of the NPRM, FHWA found that any improvement better than the baseline condition/performance, which represents a 0.1 percent improvement, would be viewed as significant progress. Although the AASHTO supported the proposed approach for determining significant progress, they argued that 0.1 percent improvement above the baseline “seems



arbitrary with no basis.” The Connecticut, Iowa, and Washington DOTs made similar comments as well. Oregon DOT cited that 0.1 percent of Oregon’s Interstate System equates to 1.5 miles for Oregon and argued that the 0.1 percent tolerance is too “tight.” They suggested 0.5 or 1 percent tolerance.

Illinois DOT requested clarification on how “significant progress” is defined, asking whether it is any improvement made toward the target, a measure of a partial percentage point, or something else.

As stated above, the proposed approach for determining significant progress is based on comparison between: (1) Target and the actual condition/performance and (2) baseline condition/performance and the actual condition/performance. To make the comparisons in a consistent manner, the language in sections 490.313(f) and 490.409(c) included precision level (*i.e.*, decimal places) of the measures, which is to be calculated to the one tenth of a percent. By specifying precision levels for the measures, FHWA believes the comparisons in significant progress determinations would be done in a consistent manner. The FHWA understands decimal places of measures could be translated to a tolerance level in making significant progress, as Oregon DOT’s example indicated. However, FHWA believes a larger tolerance level with less precision level could work against State DOTs. For example, with a 1 percent tolerance (*i.e.*, measures round to the nearest to 1 whole percent), if a State DOT actually made 0.1 percent improvement above the baseline condition/performance, it would not be considered significant progress because the 0.1 percent would be rounded down and the condition/performance level would be considered as equal to the baseline condition/performance. Therefore, FHWA retains the proposed language.

The Center for American Progress and Transportation for America stated that 2-year target establishment and significant progress determinations should be required for MPOs. They argued that accountability requirements should be the same for State DOTs and MPOs. In 23 U.S.C. 119(e)(7), biennial significant progress determinations under section 490.109 only apply to State DOT NHPP targets. There is nothing in the statute that requires a similar assessment with similar consequences for MPOs. Therefore, FHWA does not have the statutory authority to make significant progress determination on MPO targets.

The TEMPO recommended expanding section 490.109(e)(2) to allow FHWA Division Administrators to determine significant progress. As stated in section 490.109(a), FHWA will assess each State DOT target for the NHPP measure to determine the significant progress made toward its achievement with the method prescribed in section 490.109. The FHWA believes the method outlined in section 490.109 provides a fair and consistent process to determine compliance across State DOTs. Although FHWA Division Offices will notify State DOTs with the results of the significant progress determination, FHWA clarifies that no one individual in FHWA will make the significant progress determination at his or her discretion. Following the publication of the final rule, FHWA will publish guidance on the timing of significant progress determinations and notifications. Therefore, FHWA retains the language in section 490.109(e)(2), as proposed in the NPRM.

#### Discussion of 490.109(e)(3) Phase-In of New Requirements for Interstate System Pavement Condition Measures

The FHWA proposed a phase-in of new requirements for Interstate pavement condition measures. Only at the midpoint of the first performance period and only for the targets for Interstate System pavement condition measures in section 490.307(a)(1) and (a)(2), FHWA would not make a determination of significant progress toward the achievement of 2-year targets for these measures. The FHWA received comments related to the phase-in of Interstate System pavement condition measures in section 490.105(e)(7), but no direct comments on the phase-in proposed in section 490.109(e)(3).

Since these measures are being phased-in, FHWA will not determine significant progress until after the measures are established and the State DOTs have had time to complete a biennial reporting cycle. As discussed in section 490.105(e)(7), FHWA retains the language in section 490.105(e)(7)(ii) that for the first performance period only, State DOTs are not required to report their 2-year targets and baseline condition/performance for the Interstate pavement condition measures in their Baseline Performance Period Report. Accordingly, FHWA will classify the assessment of progress toward the achievement of targets for the Interstate pavement condition measures as “progress not determined” at the 2-year significant progress determination. The FHWA retains the language in section 490.109(e)(3) as proposed in the NPRM.

(See discussion for section 490.105(e)(7) for more details.)

#### Discussion of § 490.109(e)(4) Insufficient Data and/or Information

The FHWA proposed that if a State DOT does not provide sufficient data or information necessary for FHWA to make significant progress determination for each bridge or pavement condition target, FHWA would determine that the State DOT has not made significant progress toward the achievement of the applicable individual targets.

The State DOTs of Connecticut, Oklahoma, and Oregon requested that the phrase “does not provide sufficient data and/or information” be clarified.

In response to these comments, FHWA revised section 490.109(e)(4). The revised text in section 490.109(e)(4)(i) specifies that all measures must meet the reporting requirements in section 490.107. If a State DOT does not submit a required report, targets, or other information as specified in section 490.107, then FHWA will determine that the State DOT has not made significant progress toward the achievement of NHPP target.

Section 490.109(e)(4)(ii) specifies if FHWA determines that a total mainline lane-miles of missing, invalid, or unresolved sections for Interstate System is 5 percent or more, as described in section 490.313(b)(4)(i), then FHWA will determine that the State DOT has not made significant progress toward the achievement of targets for the Interstate System pavement condition measures in section 490.105(c)(1).

Section 490.109(e)(4)(iii) specifies if FHWA determines that a total mainline lane-miles of missing, invalid, or unresolved sections for non-Interstate NHS is 5 percent or more, as described in section 490.313(b)(4)(i), then FHWA will determine that the State DOT has not made significant progress toward the achievement of targets for the non-Interstate NHS pavement condition measures in section 490.105(c)(2). (See discussion for section 490.313(b)(4) for further discussion and information on the revisions to this section.)

Section 490.109(e)(4)(iv) specifies that for the NHS bridge condition measures in section 490.105(c)(3), if a State DOT’s reported data is not cleared in the NBI as of June 15, then FHWA will determine that the State DOT has not made significant progress toward the achievement of targets for the bridge condition measures in section 490.105(c)(3).

As stated above in section 490.109(e)(2), the approach for determining significant progress is

based on comparison between: (1) Target and the actual condition/performance and (2) baseline condition/performance and the actual condition/performance. Section 490.109(e)(4)(v) provides an approach for determining significant progress when reported data for baseline condition/performance is determined “insufficient” in the year in which the Baseline Performance Period Report is due to FHWA. If the data for baseline condition/performance is determined insufficient, the comparison between the baseline condition/performance and the actual condition/performance cannot be made. In this situation, FHWA will make the significant progress determination for that measure by comparing the target to the actual condition/performance. The FHWA will determine that a State DOT has not made significant progress toward the achievement of a target if data for the baseline condition/performance was determined insufficient previously, and the actual condition/performance level is not equal to or better than the established target.

#### Discussion of § 490.109(e)(5)(i) Extenuating Circumstances

The FHWA amended the language for section 490.109(e)(5)(i) related to the list of extenuating circumstances that may prevent a State DOT from making significant progress. In the final rule, FHWA added language to clarify that extenuating circumstances include the sudden discontinuation of Federally furnished data due to a lack of Federal funding. This text was added to clarify that the lack of funding is not a stand-alone reason, but it is tied to the data access associated with target establishment and evaluation.

The list of extenuating circumstances details issues that could be considered outside of State DOTs ability to make significant progress toward achieving targets. If a State DOT encounters these extenuating circumstances, State DOTs would document the explanation in their performance progress report. If the explanation is accepted by FHWA, then the associated NHPP targets would be excluded from FHWA significant progress determinations. Comments from a private citizen<sup>39</sup> supported FHWA’s proposal.

The AASHTO comment letter suggested adding the following additional extenuating circumstances: (1) Lack of Federal funding through a long-term surface transportation program; (2) Cost inflation beyond

assumed levels; and (3) another cause reported by the State not covered under the previous circumstances. The Connecticut DOT made identical comments. The California DOT commented that the situations considered extenuating circumstances are too narrow. They suggested broader circumstances to include fiscal limitations and project delivery constraints. The Illinois DOT recommended that the rule account for the uncertain funding impacts by explicitly recognizing how this might inhibit the achievement of targets for significant progress requirements and determinations in section 490.109. The Colorado and Washington DOTs sought clarification on whether a lack of funding would be considered an extenuating circumstance that would result in a finding of “progress not determined” by FHWA. The Minnesota and North Carolina DOTs commented that budget uncertainties could result in a lack of funding and should be an extenuating circumstance. The Colorado DOT requested clarification on whether a sudden, unforeseen reduction in Federal funding would be considered an extenuating circumstance. The Oregon DOT commented that the discussion of proposed extenuating circumstances covers a range of possible circumstances, but it is also limited to those specifically listed in the rule. The Oregon DOT suggested including some language to allow States to describe circumstances not on the list. They added that there could be situations not yet thought of that should be open for consideration. The Tennessee DOT proposed that the significant progress determinations account for decreases in anticipated Federal funding, inflation above expected rates, or other unforeseeable reasons. The Washington DOT commented that FHWA should consider extenuating circumstances documented by a State DOT in the assessment of progress toward the achievement of NHPP targets in the relevant State Biennial Performance Report.

The majority of the above comments wanted to add financial uncertainty to the list of extenuating circumstances. As noted in the NPRM, FHWA understands that there are many external factors that could impact the condition/performance and the State DOT’s ability to make significant progress, including financial uncertainty. However, FHWA believes that the frequency of target establishment, and the ability to adjust 4-year targets at the mid-point of a performance period creates a relatively short forecast window that should allow

State DOTs to consider the impacts of funding shortfalls and uncertainty (*e.g.*, lack of funding for investment, cost escalation, and others) in initial targets and any subsequent adjustments. As discussed in section 490.105(e)(6), the State Biennial Performance Report has the appearance that State DOTs must consider uncertainties 2 years in advance. In truth, the duration that State DOTs have to consider uncertainties is shorter than 2 years. For example, the 2-year target established in 2018 is not actually submitted until October 2018 when the first State Biennial Performance Report is due. Therefore, while it reflects a 2-year period (2018 and 2019), it is in place for less than 2 years (*i.e.*, October 2018 to December 2019). (See discussion section for section 490.105(e)(6) for additional details of the timing of reports and the impact on targets.) The FHWA does not intend to use the significant progress determination process to be punitive or to lead State DOTs to simply establish easy targets. The FHWA believes one purpose of establishing targets and assessing progress is to encourage State DOTs and MPOs to establish data-supported targets that consider anticipated resources and potential uncertainties. Establishing targets and assessing progress also encourage State DOTs to provide data-supported explanations of condition/performance changes. If a State DOT did not make significant progress because of the absence of a long-term surface transportation program, unanticipated cost escalation, and other reasons, FHWA expects that State DOT would provide data-supported explanations for not achieving significant progress.

The FHWA strongly believes transportation performance management is not just about making significant progress. It is also about effectively communicating to Congress and the public how the absence of a long-term surface transportation program, unanticipated cost escalation, and other circumstances are impacting the condition/performance of the transportation infrastructure. Moreover, FHWA believes the determination process must be meaningful and bring accountability to the program as MAP-21 and FAST Act intended. Therefore, FHWA believes that adding more circumstances to exclude State DOTs from the determination will decrease the level of accountability. For these reasons, FHWA is keeping the list of extenuating circumstances short. The FHWA modified the language in section 490.109(e)(5) only to include the

<sup>39</sup> Nicholas Cazares, Docket Letter FHWA–2013–0053–0078.



discontinuation of Federally furnished data due to a lack of Federal funding.

In section 490.109(e)(5)(ii), FHWA proposed to accept a State DOT's explanation if it pertains to the extenuating circumstances listed in section 490.109(e)(5)(i). The FHWA would classify the progress toward achieving the relevant NHPP targets as "progress not determined," and those targets will be excluded from the determination. The FHWA did not receive any substantive comments regarding this paragraph. Therefore, FHWA retains the language in section 490.109(e)(5)(ii) in the final rule.

#### Discussion of § 490.109(f) Performance Achievement Requirements

The AASHTO, Oregon DOT, and a private citizen<sup>40</sup> support basing performance achievement on two consecutive FHWA determinations. This provides State DOTs some opportunity to improve their performance before being assessed the penalty. The ASCE took the opposite view and argued that if a State DOT did not make significant progress after two consecutive reviews, intervention by the DOT should be immediate. They argued that the proposed timeline for penalties did not represent the type of speedy accountability that the public expects and that it will benefit our transportation system. Section 119(e)(7) of Title 23 of the U.S.C. required States to describe the actions they will take to achieve targets after they fail to achieve significant progress on two consecutive determinations. Subsequently, FAST Act removed the phrase "two consecutive" in 23 U.S.C. 119(e)(7) and added that the description of actions will be included in the biennial performance report under 23 U.S.C. 150(e). Pursuant to 23 U.S.C. 119(e)(7), FHWA amended section 490.109(f) so that State DOTs are required to describe the actions they will take to achieve targets after they fail to achieve significant progress for each FHWA biennial determination. The FHWA believes this required change in section 490.109(f) will ensure the accountability ASCE urged in their comment.

The Southeast Pavement Preservation Partnership commented that the short time horizon given to recognize improvement in the pavement network may force States into a "worst-first" mentality for the preservation of pavements. The FHWA agrees that indiscriminately attempting to improve condition could lead to a "worst-first" mentality. The FHWA also realizes that

the proposed language in section 490.109(f) is inconsistent with the principle of "Recognize Fiscal Constraints"<sup>41</sup> in the NPRM preamble. In addition, FHWA emphasizes that, as discussed in section 490.105, State DOTs and MPOs have the authority to establish their targets at their discretion. The MAP-21 does not provide FHWA the authority to approve or reject State DOT or MPO established targets.

Therefore, FHWA amended section 490.109(f)(1) through (f)(3) by replacing the phrase "improve . . . condition" with "achieve targets" to be consistent with the nine principles and 23 U.S.C. 119(e)(7). Similarly, in section 490.109(f)(6), FHWA replaces the phrase "improve progress" with "achieve targets" to be consistent with the statutory language in 23 U.S.C. 119(e)(7).

#### Discussion of Section 490.111 Incorporation by Reference

The FHWA proposed to incorporate by reference several items. First, FHWA proposed to incorporate the HPMS Field Manual to codify the data requirements for measures, as discussed throughout part 490, and to be consistent with the HPMS reporting requirements. Second, FHWA also proposed to incorporate by reference the Recording and Coding Guide for the Structure Inventory and Appraisal of the Nation's Bridges (NBI Coding Guide), which contains all of the NBI items listed in subpart D. Finally, FHWA proposed to incorporate by reference five permanent AASHTO Standards (M328-14, R36-13, R43-13, R48-10, R57-14) and three provisional AASHTO Standards (PP68-14, PP69-10, PP70-10) to codify the methods and devices used to collect data for the metrics (*i.e.*, IRI, Cracking Percent, rutting, and faulting). The FHWA proposed specific versions of each item in the NPRM with an understanding that future changes to the HPMS Field Manual, NBI Coding Guide, and AASHTO Standards will be subject to **Federal Register** notices. Because of the incorporation by reference, FHWA had posted the Proposed HPMS Field Manual 2015 for 2nd Performance Measure NPRM,<sup>42</sup> the 10 proposed

AASHTO Standards, and the NBI Coding Guide on the docket.

The Mid-America Regional Council expressed general support for the incorporation by reference of the proposed documents, stating "the use of widely accepted standards and calculation methods will facilitate the establishment of targets and monitoring of progress toward their achievement." The FHWA agrees and appreciates the comment.

The Alabama DOT recommended that FHWA consider adding AASHTO R56-10 (Standard Practice for Certification of Inertial Profiling Systems) in the final rule. The FHWA appreciates the need for certification of the Inertial Profiling Systems used in the HPMS data collection and included a requirement for equipment certification as part of the Data Quality Management Program in section 490.319(c). It is expected that State DOTs would specify AASHTO R56 or an equivalent standard as their method for equipment certification in the State Data Quality Management Program.

The AASHTO, Alaska DOT&PF, and Connecticut DOT recommended modifying the wording of the proposed rule "so that any proposed changes to items (b)(1) or (b)(2) would be subject to public notice and comment by State DOTs and other affected parties".<sup>43</sup> The FHWA agrees that any updated versions of the HPMS Field Manual and the AASHTO Standards will not be incorporated by reference without public notice and comment.

The AASHTO and the State DOTs of Connecticut, Florida, Mississippi, North Dakota, Iowa, and Oregon commented that AASHTO standards are developed in a voluntary manner and are used by State DOTs in a voluntary manner. Commenters noted that incorporating these standards into a Federal rulemaking is not their intended use and could cause unintended consequences. The FHWA recognizes the voluntary process used to develop AASHTO Standards and appreciates the efforts of State DOTs in creating them. However, the five permanent AASHTO Standards incorporated by reference in section 490.111 of this final rule contain well-known protocols for data collection, equipment requirements, and data compilation. These protocols are useful in determining pavement performance. Since these standards have been balloted and approved by a

[www.regulations.gov/#/documentDetail;D=FHWA-2013-0053-0050](http://www.regulations.gov/#/documentDetail;D=FHWA-2013-0053-0050).

<sup>43</sup> State DOTs of Alaska, Connecticut, Idaho, Montana, North Dakota, Oklahoma, Oregon, South Dakota, and Wyoming.

<sup>40</sup> Nicholas Cazares Docket Letter FHWA-2013-0053-0078.

<sup>41</sup> Nine principles used in the development of proposed regulations for national performance management measures under 23 U.S.C. 150(c), [www.regulations.gov](http://www.regulations.gov), Docket FHWA-2013-0053 "Recognize Fiscal Constraints"—provide for an approach that encourages the optimal investment of Federal funds to maximize performance but recognize that, when operating with scarce resources, performance cannot always be improved.

<sup>42</sup> Proposed HPMS Field Manual 2015 for 2nd Performance Measure NPRM: Docket Document FHWA-2013-0053-0050: <http://www.regulations.gov/#/documentDetail;D=FHWA-2013-0053-0050>.



majority of State DOTs, it is preferable that State DOTs use the appropriate parts of these standards to guide quality data collection, even though additional calculations may be needed to meet the reporting requirements for the HPMS Field Manual.

The AASHTO and the State DOTs of Connecticut, Iowa, Minnesota, Missouri, and North Dakota recommended that FHWA “develop a mechanism . . . to ensure that the most recent version of AASHTO standards is used or not used as appropriate.” Similarly, Oregon DOT recommended that FHWA provide States with some flexibility in which versions of AASHTO Standards they use. The Oregon DOT recommended that instead of directly referencing specific standards the final rule, FHWA should provide separate guidance for this information.

The FHWA appreciates the desire for flexibility in application of standards and the latest versions. However, Federal law requires a formal comment and review process for any modification of a document incorporated by reference in a rulemaking. The FHWA may undertake this process in the future, but there is no mechanism to automatically ensure that the latest versions of AASHTO Standards be used. The final rule retains the language in section 490.111(b).

The TEMPO, Oregon DOT, and Texas DOT expressed concern over FHWA’s proposal to use provisional AASHTO Standards that will be refined following completion of an ongoing study on cracking and rutting measurements. When provisional standards become full standards, changes may occur in the reported data, causing inconsistencies from previously reported data. The FHWA agrees with the commenters, and removed references to provisional AASHTO standards PP67, PP68, PP69, and PP70 to ensure consistency in reporting. Specific guidance on data collection and reporting for the topics covered by these provisional standards has been added to the HPMS Field Manual, which is posted on the docket. (See discussion section for section 490.309 for more details.)

In addition, the Center for Auto Safety, PSRC, and *Public Resource.org* expressed concern over the availability of the documents incorporated by reference. The PSRC commented that “section 490.111 lists AASHTO Standard Specifications that States must follow when collecting and calculating pavement distress; however, these specifications are not freely available. Please consider providing access to the AASHTO standards for pavement data collection as a component of MAP–21

implementation.” In a joint letter, the Center of Auto Safety and *PublicResource.org* expressed concern that the AASHTO standards incorporated by reference were not freely available to the public.

While FHWA acknowledges that the proposed AASHTO Standards are available for purchase on the AASHTO Web site, they were posted on the docket for review by the public. Furthermore, AASHTO provides copies of all Standards to State DOTs without charge. Therefore, FHWA retains the language as proposed.

The Louisiana DOT commented that the final rule should specify that those documents incorporated by reference are “revised to all English units of measure to be consistent and to eliminate the numerous metric to English conversion rounding issue.” The HPMS Field Manual that is incorporated in the final rule indicates that English units are the preferred method for measurement. However, there is no prohibition on using metric devices for measurement and converting measurements to the English standards. State DOTs electing to convert metric measurement are guided to follow the accepted U.S. standard process<sup>44</sup> for conversions.

Regarding the proposed HPMS Field Manual, Wisconsin DOT asked when the proposed file that reflects these changes would be available if the HPMS Field Manual would continue to be re-released every year. In response to those questions, the final rule incorporates the revisions to the HPMS Field Manual, which is available on the docket with the final rule. The incorporation by reference requires that future updates to the HPMS Field Manual be made through a formal public comment and review process.

The PSRC asked which standards should be used to collect IRI data. The PSRC also asked for clarification on the following: (1) Whether bituminous road would include those with a chip seal wearing surface; (2) whether the AASHTO method required for distress evaluation is also appropriate for chip sealed surfaces; and (3) whether the percent cracking distress only refers to fatigue and/or alligator cracking.

In response, the HPMS Field Manual has been revised to clarify the standards to be used to collect and report all pavement measurements to the HPMS.

The AASHTO commented that in section 490.309(a), the word “include” should be changed to “are.” The use of “include” suggests that there could be

additional pavement metrics or requirements that are not discussed in this section or elsewhere in the NPRM. The FHWA appreciates the comment and has amended the language in section 490.309(a) to clarify the extent of the metrics and data elements State DOTs are required to report.

#### *B. Subpart C National Performance Management Measures for Assessing Pavement Condition*

##### Discussion of Section 490.301 Purpose

To implement the statutory provisions under 23 U.S.C. 150(c)(3)(A)(ii)(I) and (II), FHWA proposed a statement of purpose which required the establishment of performance measures for State DOTs to use to assess the condition of pavements on the Interstate System and the NHS excluding the Interstate System. No comments specific to this section were received, although Washington DOT concurred with the concept that MAP–21 provided more flexibility in the use of Federal funds.

##### Discussion of Section 490.303 Applicability

This section described the applicability of this rule to highways on the NHS for purposes of implementing the NHPP. Comments from 19 State DOTs (Arkansas, Colorado, Connecticut, Florida, Georgia, Iowa, Maine, Maryland, Michigan, Mississippi, Missouri, New Hampshire, Oklahoma, Oregon, Pennsylvania, Texas, Vermont, and Washington State), and AASHTO expressed concerns about the requirements to report pavement conditions on routes not owned or operated by States. The commenters also inquired as to whether required reporting included ramps and similar connectors.

In the NPRM, FHWA indicated that the pavement measure would apply to all mainline highways on the NHS. The 19 State DOTs identified above, the AASHTO, AMPO, ARC, Center for American Progress, COMPASS, NARC, National Center for Pavement Preservation, NYMTC, and one anonymous commenter generally agreed that State DOTs and MPOs have no authority or control over maintenance and/or investment decisions on some of the assets on NHS. Therefore, commenters said State DOTs and MPOs should not be held responsible for the reporting of data. The commenters suggested that the responsibility for data collection, reporting, and programming rests with the entities that own the highway system. Similar comments were raised, as discussed in section 490.105(d), regarding highway

<sup>44</sup> Process is defined in Publication SP 1038–2006 from the National Institute of Standards.

ownership as it pertains to the accountable entity to establish and achieve targets. The statutory language in MAP-21 requires that the performance management requirements under 23 U.S.C. 150 and NHPP under 23 U.S.C. 119 apply to the entire NHS and Interstate System, not to a subset of the NHS (e.g., "State DOT owned or operated Interstate System," "State DOT owned or operated National Highway System," and others) as the commenters would prefer. The MAP-21 does not define the terms "State" and "MPOs" for purposes of 23 U.S.C. 150 and 119 as something other than what is already defined elsewhere in MAP-21. Accordingly, FHWA retains the language in section 490.303 for purposes of the performance management requirements in 23 U.S.C. 150 and 119(e)(7), which require performance measures for the entire NHS and Interstate System within the State. The FHWA evaluated the extent of the enhanced NHS that is not owned or maintained by State DOTs. In that analysis,<sup>45</sup> FHWA found that a majority of State DOTs own at least 90 percent of the Interstate (40 States) and non-Interstate NHS (28 States) within the State boundary. The FHWA expects State DOTs to coordinate with other entities that own and maintain portions of the NHS in support of these new performance requirements.

The New York DOT and Seattle DOT provided comments to express concern with the focus on the NHS. They commented that this system only comprises a portion of the roadways they need to maintain and improve. The FHWA appreciates these comments and recognizes the challenges that transportation and planning organizations are faced with in managing the transportation system under tight budgetary constraints. However, 23 U.S.C. 150 requires the measure to apply to both the Interstate System and the non-Interstate NHS and precludes FHWA from establishing measures outside those areas described in 23 U.S.C. 150(c). Therefore, FHWA cannot change the applicability of the measures beyond the limits defined in this section of title 23 U.S.C. (See discussion on target scope for the measures in the discussion section for section 490.105(d)(1).)

The National Highway System routes for pavement conditions are specifically defined as mainline highways excluding ramps and connectors. The comments received on the proposed requirement to limit the applicability to the mainline highways of the NHS for the pavement

measure were supportive of this requirement.

#### Discussion of Section 490.305 Definitions

The NPRM proposed a number of definitions related to pavement performance to clarify specific meaning in Subpart C. Where additional clarification is needed, the HPMS Field Manual is to be used for interpretation. The Ada County Highway District (ACHD) commented that both the definition and means of computing Cracking Percent are unclear. They requested that the final rule either describe how the metric should be computed or reference the HPMS Field Manual, whose definition is clearer. The Iowa DOT expressed concern over the definition of PCC pavements. They noted that the definition does not appear to cover all possible types of cracks and is overly simplistic. As a result, a very small crack could cause an entire pavement slab to be assigned a "failing" grade. They suggested that the definition use "percent slabs cracked" for PCC overlay projects. The FHWA agrees with this concern and has made changes to the thresholds for PCC pavements described below and in revisions to the HPMS Field Manual. The Portland Cement Association commented that composite pavement should be added to the rule as a fourth pavement type. They remarked that composite pavements consist of an asphalt overlay of existing concrete pavement (either jointed or Continuously Reinforced Concrete Pavement). They argued that composite pavement behaves differently than asphalt pavements and will respond differently to preservation, repair, rehabilitation, and replacement requirements. As such, defining composite pavement as a separate pavement type will provide a more consistent assessment of roughness and distress. While there is merit to this suggestion, not all State DOTs have a complete inventory indicating the limits of composite pavement on their networks. The FHWA has concerns about the cost of requiring this level of detail and does not find it justified at this time. Therefore, the comment was not accepted.

An anonymous commenter requested that FHWA add additional details to the pavement cracking definition, noting that the definition in HPMS is too vague. The FHWA does not think the definition used here is too vague; however, the details about measurement and reporting have been revised in the sections that follow to improve clarity.

The Oregon DOT expressed concern with the definition for Cracking Percent, spalling, and visible defects in the proposed rule. In addition, the commenter stated that the proposed unintentional break cracking definition is not included in AASHTO standards or the HMPS Field Manual. The definitions in the final rule are identical to those used in the HPMS Field Manual and are intended to cover the typical conditions that are typically measured on highway pavements. The NPRM defined a term called Pavement Surface Rating that might be used with manual evaluation of pavement surfaces. The Alabama DOT stated that PSR should refer to "Present Serviceability Rating", rather than "Pavement Surface Rating." The FHWA acknowledges the error in the term used and has revised the language the definition to read "Present Serviceability Rating" (PSR) as "an observation based system used to rate pavements." The prohibition on its use was deleted from the definition because the use of PSR is permitted in the final rule for reporting conditions on certain pavement sections as discussed in sections 490.309 and 490.311.

In a joint submission, the State DOTs of Vermont, Maine, and New Hampshire commented that the definition for cracking in the proposed rule was unclear and stated that more work is necessary to identify data collection requirements and interpretation of the cracking performance metric. In addition, the commenters expressed concern with the proposed data collection methodology for rutting. The commenters said the 5-point system can underestimate rutting measurements and the differences between the 5-point system and the automated transverse data profile can lead to inconsistent data presentation at the national level. The FHWA agrees that there is some ambiguity in the description of the methods used for collecting and reporting cracking and rutting and has made changes in the sections that follow. The definitions used in the NPRM are adequate and have been retained in the final rule. The Louisiana DOT expressed concern with several definitions in the proposed rule and urged FHWA to develop standardized definitions. In addition, the commenter remarked that the proposed rule did not include a definition for transverse crack. The issues raised by Louisiana are covered in the specific sections of the final rule and discussed in the sections describing the measurement and reporting of each distress.

In the final rule, FHWA adds a definition for a "Pavement Section" as a nominally 0.1 mile-long reported

<sup>45</sup> Docket Document.



segment that defines the limits of pavement condition metrics required by FHWA. The added definition is to clearly differentiate between reported condition metric sections and dynamically segmented condition metric sections for calculating measures and determining missing, invalid, and unresolved data. Please see discussion in section 490.309 for more details.

The FHWA proposed a definition for the term “sampling” as “a means for measuring pavement conditions on a short section of pavement as a statistical representation for the entire section.” The FHWA also proposed in the NPRM that sampling is not to be used to measure or rate Interstate and non-Interstate NHS pavement conditions. As discussed in section 490.309, FHWA retains the language stating that no sampling of condition metric and inventory data items is allowed for required pavement condition data and their inventory data items for performance measures or condition rating. To ensure consistency, FHWA revised the definition of sampling by adding “Sampling is not to be used to measure or rate NHS pavement conditions.” This reflects the requirements in sections 490.309 and 490.313(e).

#### Discussion of Section 490.307 National Performance Management Measures for Assessing Pavement Condition

This section proposed four performance measures required by 23 U.S.C. 150(c)(3)(A)(ii)(I) and (II) for measuring pavement conditions, two for the Interstate System, and two for the NHS excluding the Interstate System. Twenty comments were received from highway agencies, planning organizations, local governments, and industry. In summary, the issues raised included: (1) Not including traffic in the measures; (2) the use of the terms “Good,” “Fair,” and “Poor;” (3) inconsistency in how those terms are determined for pavements and bridges; and (4) finalizing the enhanced NHS.

In the NPRM, FHWA asked for comments on whether other factors such as facility location, functional class, level of use, or environment should be considered in the design of the pavement performance measure. The Louisiana DOT disagreed with the language in the proposed rule. The commenter argued that traffic is an important measure of pavement condition because of the impact that truck traffic has on the long-term structural viability of pavements and bridges. The AMPO, NYMTC, and Washington DOT provided comments

that suggested the pavement measures be weighted by the level of traffic on the roadway. The FHWA agrees that traffic impacts pavement conditions. However, FHWA believes incorporating traffic volume in the pavement condition measures could unintentionally force the State DOTs and MPOs put more emphasis on high-trafficked highway sections. The FHWA believes incorporating traffic in the investment decisionmaking should be dictated by local priorities. So, FHWA does not incorporate traffic in the pavement condition measures in the final rule. A private citizen, William Grenke, commented that there should be separate ratings for pavement performance and pavement maintenance level of service. While there is merit to this suggestion, the statute limits pavement performance in this rule to pavement conditions.

The AASHTO, Maryland SHA, and Minnesota DOT suggested expanding the terms “Good”, “Fair”, and “Poor” to describe the level of repair needed to address each respective condition level. The Connecticut DOT opposed making this change. The Memphis MPO expressed support for the transition to a numerical based scoring system to assess the quality of NHS roads and bridges as well as Interstate pavement. The commenter argued that using numerical scoring eliminates the ambiguity associated with qualitative scores (e.g., Good, Fair, or Poor).

In selecting the terms and calculation methodologies in the final rule, FHWA intended to identify pavement conditions where “Good” suggests no major investment is needed and “Poor” suggests conditions where major investment for pavement reconstruction is needed. “Fair” pavement conditions suggest that minor expenditures for maintenance and repairs are expected. The MAP-21 delegates the selection of actions to States. It would be inappropriate for FHWA to prescribe any actions needed to address a respective condition level. The FHWA agrees with comments from Connecticut DOT that no change should be made to these terms and definitions as they are terms commonly understood by the public.

The AASHTO, NEPPP, and NYMTC commented that the focus on Good and Poor conditions will not promote management practices to preserve existing conditions. The focus on Good and Poor pavements conditions for measuring performance is not intended to prescribe State DOT management practices. The statute makes preservation activities eligible for NHPP funding and State DOTs may find that

preservation programs are cost effective ways to achieve performance targets. However, FHWA has no authority to require them to use preservation programs.

The South Carolina DOT commented that the rating system of Good, Fair, and Poor as a national standard presents a conflict. By setting new metrics for measuring system performance nationally, it challenges State DOTs to tell a new story about the condition of their assets. If State DOTs have traditionally used those terms in their own metrics to communicate the condition of our asset to the public, stakeholders, and legislators, it could give the appearance that State DOTs are “manipulating the information.” The South Carolina DOT also commented that they have no issue with complying with the rule, but recommended that FHWA grant State DOTs the discretion in their reporting to remain consistent in what and how they have been communicating the condition of their assets. The AASHTO, NYSAMPO, and the State DOTs of California, Connecticut, Michigan, and Oklahoma suggested that the Fair condition level be defined and added to the list of four required measures. The Washington DOT commented that they did not see the need for a Fair category, and were in agreement with FHWA’s use of Good and Poor.

The FHWA believes the net increase or decrease of percent Fair network condition does not easily indicate improvement or declining condition. For example, if there was an increase in percent Fair, it could be the result of declined condition of pavement sections that were previously rated as Good condition or improved condition of pavement sections that were previously rated as Poor condition. Therefore, the net increase (or decrease) in percent Fair may not adequately portray condition improvement (or decline) for the highway network. The FHWA believes that focusing on Good and Poor conditions will better indicate improvement or decline of network condition and also will better inform the public about pavement conditions and what they should expect from investments in highway pavements. Finally, the requirement to establish targets for each of the final four measures does not prohibit a State DOT or MPO from focusing on maximizing Fair conditions. For these reasons, FHWA retains the four measures in the final rule.

A few commenters commented that the approaches to determining Good, Fair, and Poor conditions should be consistent for pavements and bridges.



The FHWA proposed approaches that determine pavement condition levels based on the predominance of metric condition levels and bridge condition levels based on the lowest metric condition level. In the NPRM, FHWA discussed how each of these approaches supported current practice and the findings of pilot studies<sup>46</sup> conducted prior to the rulemaking effort. Although the methods for determining pavement and bridge condition levels are different, the results of the two methods discussed in the studies provide sound assessments of the condition level of pavements and bridges. Consistency or using a single methodology to determine pavement and bridge condition level is desirable from a process standpoint. However, having assessments that best reflect the condition of pavements and bridges is more desirable. It is also important to note that pavements and bridges are two distinct types of assets with distinct performance characteristics. Therefore, having different methodologies for determining their condition levels should not be unexpected. The FHWA retains the two methodologies for assessing the condition level of pavements and bridges in the final rule.

The TEMPO expressed concerns that the criteria used to identify the NHS are still being developed for implementing performance measures applicable to the NHS. They commented that if this issue is not addressed before reporting and evaluation deadlines are implemented, State DOTs and MPOs could expend significant resources collecting, analyzing, and maintaining data that is not part of the final NHS. They urged FHWA to delay implementation of the new pavement requirements until the limits of the NHS are finalized.

As discussed in combined discussion sections for sections 490.105(e)(1) and 490.105(f)(1), FHWA cannot delay the due date of the State DOT target establishment or the State DOT reporting on performance targets because of the statutory deadlines in MAP-21. The FHWA also recognizes that NHS limits could change during a performance period. Therefore, FHWA revised section 490.105(d)(3) in this final rule so that State DOTs are no longer required to declare and describe NHS limits in their Baseline Performance Period Report. As a result, the changes in NHS limits during a performance period would be accounted for. As discussed in section 490.105(d)(3), the National Highway

System Data Item in HPMS and the Highway System of the Inventory Route Data Item in NBI are required to be reported to FHWA annually together with the condition metric data. The NHS limits for pavement condition measures will come from the same data set submitted to HPMS in the same year as the performance condition metric data is submitted, and NHS designation for bridge condition measures will come from the same NBI data set as the performance condition metric data of the same year. (See more details on implementation timeline discussion in sections 490.105(e)(1) and 490.105(f)(1) and discussion on NHS limits in the discussion for section 490.105(d)(3).)

#### Discussion of Section 490.309 Data Requirements

The FHWA proposed four condition metrics to be collected and reported to the HPMS to calculate the pavement measures. These metrics included IRI, rutting, faulting, and Cracking Percent. Comments on the inclusion of these four metrics were primarily focused on the consideration of IRI as a required metric. The AASHTO and eight State DOTs<sup>47</sup> commented that, of the four proposed metrics, IRI is the only one ready to be measured consistently in all States and therefore should be the only measure of pavement condition. Alternatively, they suggested that the additional three metrics be phased in over time. In contrast, the ACPA, Cemex USA, Connecticut DOT, Georgia DOT, Illinois DOT, Louisiana DOT, Ohio DOT, and PCA supported the use of the four metrics. Some commenters<sup>48</sup> suggested that the four metrics not be equally weighted in the calculation of the pavement measures. The FHWA considered these differing opinions and elected to retain the requirement for the collection and reporting of the four metrics. The FHWA has found through documented research<sup>49</sup> that nearly all State DOTs currently use more than IRI in their pavement management programs. Publications by recognized pavement experts indicate that pavement conditions cannot be determined using only IRI alone.<sup>50 51 52 53</sup> However, FHWA

recognizes and appreciates that the methods to collect and report the rutting, faulting, and Cracking Percent metrics may be new to some State DOTs. The Alabama DOT suggested that FHWA replace IRI with Mean Roughness Index (MRI) in order to avoid confusion. The FHWA agrees with Alabama that MRI is the correct measurement and the HPMS Field Manual has been revised to clarify this distinction. The term IRI is still used because it is familiar to most users even though the actual collection and reporting is the MRI value.

The FHWA recognizes that the level of pavement data collection for the four metrics is more intensive than the HPMS requirements in previous years and will require time for State DOTs to adjust contracts and equipment to comply. The final rule delays the requirements for pavement data collection until January 1, 2018, for Interstate highways and until January 1, 2020, for non-Interstate NHS routes. Further, FHWA has delayed the implementation of data collection, reporting, and target establishment requirements so that the first performance period begins in 2018. The phased approach pushes the determination of baseline pavement conditions for the first performance period from 2018 to 2020 (the mid-point of this period). This phased approach to target establishment for the pavement measures is presented in the discussion for section 490.105(e)(7). The FHWA believes that these actions will advance the state of practice to more consistently collect and report rutting, faulting, and cracking while allowing for a phased approach to full implementation.

Several commenters,<sup>54</sup> primarily representing local governments and

<sup>51</sup> "Pavement Asset Management", Uhlmeier, J., Luhr, D., and Rydholm, T., Washington State Department of Transportation. 2016: <https://www.wsdot.wa.gov/NR/rdonlyres/E93CF754-0452-4FDE-92BA-02A7BC4CB98A/0/WSDOTPavementAssetManagement2816.pdf>.

<sup>52</sup> "Performance Measures for Pavement Assets under Performance Based Contracts", Alyami, Z., Tighe, S., Gransberg, D., 9th International Conference on Managing Pavement Assets, 2014: <https://vtechworks.lib.vt.edu/bitstream/handle/10919/56400/ICMPA9-000173.PDF?sequence=2&isAllowed=y>.

<sup>53</sup> "Performance Measures: Pavement Condition 2015", Kansas DOT 2015: [https://kdotapp.ksdot.org/perfmeasures/documents/pavement\\_fact\\_sheet.pdf](https://kdotapp.ksdot.org/perfmeasures/documents/pavement_fact_sheet.pdf).

<sup>54</sup> City of Fremont, CA, City of Santa Rosa, CA, City of Vacaville, CA, Colorado DOT, Contra Costa County, CA, County of Marin, CA, Metropolitan Transportation Commission, Oversight Committee for the California Local Streets and Roads Needs Assessment, Puget Sound Regional Council, Rural counties Task Force, California DOT, Cemex USA, City of Vancouver, WA, Connecticut DOT, County of Los Angeles, Oregon DOT, South Dakota DOT,

<sup>46</sup> Improving FHWA's Ability to Assess Highway Infrastructure Health Pilot Study Report FHWA-HIF-12-049 2012.

<sup>47</sup> Alaska DOT&PF, Connecticut DOT, Idaho DOT, Montana DOT, North Dakota DOT, South Dakota DOT, Washington State DOT, and Wyoming DOT, Michigan Asset Management Council, Michigan State Transportation Commission.

<sup>48</sup> Oregon DOT, Association of Metropolitan Planning Organizations, and Illinois DOT.

<sup>49</sup> NCHRP Study 401 "Quality Management of Pavement Condition Data Collection 2009."

<sup>50</sup> "Pavement Management Practices in State Highway Agencies": Newington, Connecticut Peer Exchange Results. 2011: <http://www.fhwa.dot.gov/asset/pubs/hif11036/hif11036.pdf>.

planning organizations, objected to the use of IRI as a metric in the calculation of the pavement measure. The ACHD, for example, commented that collecting data on low speed roads is difficult and generally results in poor quality data. As such Ada County suggested dropping IRI as a measure for local roads. Similarly, the city of Santa Rosa commented that while the California DOT is collecting IRI data on California's NHS, it will likely be the responsibility of local agencies to collect IRI data in the future. This change could disrupt established process for PCI collection and will result in increased cost and duplicative data collection efforts. The Alaska DOT&PF commented that asphalt cracking has no standard method of collection, remarking that two methods, windshield and laser, are not comparable. Finally, CEMEX USA and the Portland Cement Association suggested adding Remaining Service Interval as a condition metric. The majority of the commenters represent cities and counties that utilize the Pavement Condition Index (PCI) as their primary method to assess pavement conditions. The commenters noted that the PCI method does not include IRI nor an assessment of ride quality. Several commenters, primarily local agencies in California, commented that applying IRI to local roads could lead to "worst-first" strategies. Additionally, the ACHD commented that using IRI on local roads may mean that cost-effective pavement preservation techniques (e.g., chip seals) will no longer be useful as they can negatively impact IRI. The commenters expressed a number of concerns related to the cost and burden of collecting IRI using a high speed profiler testing device; and the lack of correlation between PCI and IRI. In addition, many of these commenters suggested that local agencies be allowed to use their own methods to classify pavements as being in Good, Fair, or Poor condition. The ACHD suggested that straight-edge based methods could replace IRI or manual methods on local roads. This alternative method would remain accurate and would be much more practical. Furthermore, as discussed later in this section, a number of commenters raised concerns with the

accuracy of collecting IRI in urban environments. Discussions with manufacturers of IRI data collection equipment and the comments from the Road Profiler Users Group confirmed that this is particularly difficult where posted speed limits are less than 40 mph, usually in urban settings. In the final rule, an alternative method known as PSR is permitted to determine the overall condition of pavement sections only on roadways where posted speed limits are less than 40 mph.

In section 490.309(b) of the NPRM, FHWA proposed the data collection requirements for Interstate and non-Interstate NHS pavements necessary to calculate the four pavement condition metrics. A wide range of comments was received on these proposed data collection requirements. This section includes a discussion on the response to the comments and the changes resulted in the final. This discussion is organized into the following categories of issues raised by commenters:

- Reference to AASHTO protocols
- Collecting data in both directions on Interstate pavements
- Collecting data at an annual frequency for Interstate pavements
- Collecting IRI data on lower speed roadways
- Processing data at 0.10 mile intervals
- Requiring full extent data collection on the full NHS for all four metrics
- Using structure type to identify and exclude bridges
- Travel lane required for data collection
- Devices for rutting collection

#### Reference to AASHTO Protocols

Because the data requirements to calculate pavement performance vary somewhat from current data collection practices, the NPRM specified defined collection protocols for each of the required data elements. The majority of the methods and standards for data collection are outlined in the HPMS Field Manual and reference some of the aspects of certain AASHTO Standards. These documents are incorporated by reference in section 490.111. Several adopted and provisional AASHTO Standards were specified in the NPRM with the intention of providing guidance and background for measuring data needed to determine performance.

The AASHTO and others<sup>55</sup> submitted comments about the proposed methods for data collection, suggesting that these

standards were never intended for regulatory purposes. The comments noted distinctions between AASHTO Standards and those in the HPMS Field Manual for cracking measurement. The commenters also noted that AASHTO Provisional Standards PP68–14, PP69–10, and PP70–10 were never intended as permanent standards, are subject to change, and inappropriate for use in rulemaking.

The FHWA recognizes that AASHTO Standards were not specifically designed for collecting data that is used for pavement performance evaluations. However, the 10 AASHTO Standards incorporated by reference in section 490.111 contain well-known protocols for data collection, equipment requirements, and data compilation that are useful in determining pavement performance. It is preferable that State DOTs use the appropriate parts of these standards to guide quality data collection even when additional calculations are needed to meet the requirements for the HPMS Field Manual. For example, AASHTO Standard PP68–14 contains excellent methods to collect cracking images in asphalt pavements. Additional calculations can easily be done to make this value meet the HPMS requirement for area of pavement cracked. Guidance on how to make these calculations is included in the HPMS Field Manual. The FHWA agrees with AASHTO that including the provisional standards PP67–14, PP68–14, PP69–14, and PP70–14 as requirements in the rule is inappropriate. The FHWA directs State DOTs to refer to the HPMS Field Manual for data collection methods for automated data collection of pavement cracking and rutting. However, FHWA recognizes the extensive efforts by State DOTs involved in developing these provisional standards. The HPMS Field Manual may continue to reference them as preferred methods for data collection with specific guidance for making calculations from that data to report pavement conditions to HPMS.

#### Collecting Data in Both Directions on Interstate Pavements

The FHWA proposed in section 490.309(b) for State DOTs to collect data in both directions of travel for the full Interstate for all four condition metrics to accurately capture the directional differences associated with pavement type, age, traffic loading, and roadway geometry. Three State DOTs and one planning organization<sup>56</sup> expressed

Seattle DOT, Orange County Transportation Authority, City of Portland, OR, City of Sacramento, CA, City of Gilroy, CA, City of Napa, CA, Town of Tiburon, CA, City of Spokane, WA, California Association of Counties, South Jersey Transportation Planning Organization, Portland Cement Association, American concrete Pavement Association, Northwest Pavement Management Association, Fugro Roadware, NCE, Brian Domsic, John Harvey, An anonymous commenter, Stephen Mueller Consultancy, League of California Cities, and LA DOT.

<sup>55</sup> Colorado DOT, Connecticut DOT, Florida DOT, Georgia DOT, Idaho DOT, Illinois DOT, Minnesota DOT, Montana DOT, North Dakota DOT, Oregon DOT, Rhode Island DOT, South Dakota DOT, Wyoming DOT, Mid-America Regional Council, and Southeastern Pavement Preservation Partnership.

<sup>56</sup> Georgia DOT, Missouri DOT, Oregon DOT, Atlanta Regional Commission.



concerns with the burden associated with collecting data in both directions. The Maryland State Highway Administration and Missouri DOT suggested a revision to the final rule to limit the requirement for collection in both directions to only those cases where the highway is divided with either a median or a physical barrier. Conversely, two State DOTs<sup>57</sup> commented that they collect data on their Interstate in both directions, and in some cases, in all lanes. In addition, it was noted by the Oregon DOT that data for the required inventory metrics (Through Lanes, Surface Type, and number of lanes) are collected and reported in one direction only, which may not represent information in the non-inventory direction correctly. In the NPRM, an HPMS review indicated that 52 percent of State DOTs do not report data in both directions on the Interstate. The comments received on this requirement support that finding.

Contrary to the comments opposing data collection on both directions of Interstate System, the joint letter from the Maine, New Hampshire, and Vermont DOTs supported the pavement condition data requirements on “both barrels of dual-carriageways.” The letter stated that the New Hampshire DOT has been measuring pavement condition and other measurements on each carriageway for all of their Interstate System for “several years and it has taken significant effort to combine the data for FHWA purposes.” They noted that requiring data for “both barrels” of divided Interstate System would relieve them from additional post-processing and create a more comprehensive picture of the statewide pavement condition in their State. They also recommended FHWA to consider the dual-carriage data format to support FMIS, which intends to use HPMS data as its source.

In a recent study for FHWA,<sup>58</sup> pavement conditions were measured in both directions on a significant number of miles of Interstate highways. The findings indicated that the difference in pavement conditions between the two directions was insignificant. This supports the claims made in the comments indicating that data collection in both directions on Interstate highways is not warranted. However, FHWA also recognizes that agencies, like New Hampshire DOT, collect their data in a dual-carriageway data format for a more comprehensive

assessment of the statewide pavement condition and for better integrating with FMIS. Therefore, section 490.309(b)(1) in the final rule was amended to require pavement data reporting for “at least one direction” for the Interstate System, and section 490.309(b)(1)(iii) in the final rule provides State DOTs the option to collect and report pavement condition data separately for each direction of divided highways (carriageway) on the Interstate System. Please note if a State DOT chooses to exercise the option of reporting Interstate pavement data in dual-carriage data format, then that State DOT must report the data for the entire Interstate System within the State (*i.e.*, no partial network dual-carriage option allowed). As stated previously, FHWA provides this option for State DOTs for a more comprehensive assessment of their statewide pavement condition and for better integrating with FMIS. The FHWA expects State DOTs to not convert data format only to meet the minimum Interstate pavement condition level and/or to make significant progress. Considering a substantial amount of effort required to convert data format (*i.e.*, single/inventory direction to dual carriage or vice versa) in accordance with HPMS Field Manual, FHWA does not believe State DOTs will convert the data format just to meet the minimum Interstate pavement condition level and/or to make significant progress. Therefore, FHWA does not specify an allowable frequency of changes in data format in the final rule so that State DOTs have the flexibility of converting their Interstate data format at any time. The FHWA recommends that State DOTs should carefully examine the effects of data format conversion on condition/performance trends and on the ability to meet the minimum Interstate pavement condition level and significant progress toward achieving targets. Also, it is important to note that if a State DOT decides to report Interstate System data in a dual-carriageway data format, then the Interstate pavement metrics in section 490.311 will be determined separately for each direction (*i.e.*, inventory and non-inventory directions) and the Interstate pavement measures in section 490.313 will be computed using the data from both directions of the Interstate highways. Please refer to the HPMS Field Manual in the docket for data requirements associated with dual-carriageway data format for Interstate System.

#### Collecting Data on an Annual Frequency for Interstate Pavements

The FHWA proposed to maintain the current HPMS requirement to collect

data annually for the IRI metric and an increased frequency of annual (from biennial collection) collection for the Cracking Percent, rutting, and faulting metrics for the Interstate System. A total of 23 comments<sup>59</sup> addressed the proposed annual data collection requirements. The majority of these commenters expressed concern with the costs and burden associated with annual data collection and questioned the need to capture annual changes in pavement condition. The Oregon DOT noted that an evaluation of their annual collection efforts after 7 years of testing concluded that “it was not necessary or cost effective to collect data annually,” citing that the overall condition does not change dramatically from year to year. The Michigan State Transportation Commission and Michigan Asset Management Council opposed the annual data collection requirement and recommended that FHWA work in cooperation with States to determine the most appropriate frequency and level of detail for data collection. In general, the commenters did not feel it was necessary to capture annual changes in condition.

The Rhode Island, Pennsylvania, and Minnesota DOTs commented that they collect data on their Interstate System on an annual basis. The Rhode Island DOT commented that their data coverage and frequency were the result of a recommendation by the National Center for Pavement Preservation to account for the rapid deterioration that pavements in Rhode Island can exhibit from year to year due to the weather conditions. Fugro Roadware supported the proposed data coverage and data collection frequency. Fugro Roadware emphasized the importance of identifying many of the potential problems early and clearly so that State DOTs and other agencies can ensure that they are optimizing the work performed on the network to limit deterioration and potential need for more advanced and expensive treatments.

The FHWA believes that the minimum Interstate pavement condition requirements in 23 U.S.C. 119(f) require annual assessments of condition. The FHWA recognizes that, for a specific pavement, conditions may not change

<sup>59</sup> AASHTO, California DOT, Connecticut DOT, Delaware DOT, Hawaii DOT, Idaho DOT, Iowa DOT, Maryland DOT, Michigan DOT, Minnesota DOT, Montana DOT, North Carolina DOT, North Dakota DOT, Oregon DOT, Pennsylvania DOT, Rhode Island DOT, South Dakota DOT, Northeast Pavement Preservation Partnership, Southeastern Pavement, Preservation Partnership, NYSAMPO, SJTPO, Michigan State Transportation Commission (STC) and Michigan’s Transportation Asset Management Council (TAMC).

<sup>57</sup> Tennessee DOT, New Hampshire DOT.

<sup>58</sup> Evaluation of Pavement Conditions on the Interstate System: Preliminary Summary, Rada 2015.



dramatically each year. However, FHWA believes that changes in conditions of the full-extent Interstate System within a State will be evident from year to year due to construction activities, weather events, and variability in the durability of the highway pavements. State DOTs have been reporting IRI for the Interstate highways to HPMS on an annual basis since 1989. A review of the HPMS data from 2007 to 2011 showed that 29 State DOTs reported at least a 1 percent change in the IRI for their Interstate pavements in Good condition. During the same period, 10 State DOTs reported at least a 10 percent change in annual Good pavement condition levels.

Although the new pavement measure includes multiple condition metrics, FHWA believes this account of historical changes in IRI condition suggest that similar changes should be expected for the new pavement measure. Furthermore, FHWA believes that the 0.1 percent reporting accuracy required of the new pavement measure necessitates at least an annual frequency of testing in order to accurately determine State DOT compliance with the minimum condition requirements in 23 U.S.C. 119(f).

As discussed in the Executive Summary, the FAST Act removed the phrase “two consecutive reports” in 23 U.S.C. 119(f)(1)(A), which relates to triggering the penalty for when the Interstate pavement condition has fallen below the minimum condition level established under this rule. Under the FAST Act the penalty will be based on each FHWA minimum condition level determination instead of two consecutive minimum condition level determinations. The FHWA believes that the changes due to FAST Act further support the importance of the annual data collection for implementing the statutory requirements under 23 U.S.C. 119(f)(1).

For these reasons, FHWA retains the requirement of annual data collection for all four condition metrics for the Interstate pavements in the final rule.

#### Collecting IRI Data on Lower Speed Highways

The FHWA proposed that IRI data be collected on all NHS roadways. As previously discussed, a number of commenters<sup>60</sup> noted the challenges with collecting IRI data on roadways in urban settings and lower speed roadways. Although IRI is a well-known

measure for pavement performance, it is less detectable to highway users at low speeds and less useful as a measure of pavement performance. To specifically address this issue, FHWA added an alternative method known as PSR<sup>61</sup> that may be used to determine overall pavement condition for Interstate and non-Interstate NHS sections where the posted speed limit is less than 40 mph (sections 490.309(b)(1)(iv) and 490.309(b)(2)(iii)). The intent of this change is to allow continued use of a method that has been a part of HPMS for many years to provide pavement condition information for locations where IRI data collection is not practical. In addition, section 490.309(b)(2)(iii) provides that State DOTs may use conversions to PSR from other pavement condition assessment methods, such as the U.S. Army Corps of Engineers PCI,<sup>62</sup> if they demonstrate to FHWA that the conversion produces pavement conditions equivalent to the PSR method.<sup>63</sup> (See discussion section for section 490.313(b) for the thresholds to define Good, Fair, and Poor condition levels based on PSR.)

#### Processing Data at 0.10 Mile Intervals

The FHWA proposed in sections 490.309(b) and 490.311(c) that data be collected and reported at 0.10 mile intervals for the four pavement metrics for the full NHS to provide better uniformity and increased accuracy in condition assessment. The majority of commenters, including 18 State DOTs,<sup>64</sup> 3 industry associations,<sup>65</sup> 2 planning organizations,<sup>66</sup> ACHD and AASHTO opposed or expressed concerns with the proposed requirement. In general, the commenters noted that the uniform 0.1 mile reporting requirement did not align with their current State DOT pavement measuring and reporting practices. The commenters cited the costs to conform to this requirement and urged FHWA to consider an approach that would provide greater flexibility to State DOTs to allow for varying reporting lengths.

<sup>61</sup> Carey and Irick, Highway Research Bulletin (1960).

<sup>62</sup> ASTM Standard D6433.

<sup>63</sup> An example in publication: Al-Omari and Darter, ULUI-ENG-92-2013 (1992).

<sup>64</sup> Georgia DOT, New York State DOT, North Carolina DOT, North Dakota DOT, Pennsylvania DOT, South Dakota DOT, Wyoming DOT, Idaho DOT, Minnesota DOT, Mississippi DOT, South Carolina DOT, Texas DOT, Colorado DOT, Illinois DOT, Iowa DOT, Alabama DOT, Connecticut DOT, and Montana DOT.

<sup>65</sup> Road Profiler User's Group, NCE, Agile Asset Inc., and Northeast Pavement Partnership.

<sup>66</sup> Texas Association of Metropolitan Planning Organizations and Association of Metropolitan Planning Organizations, Michigan State Transportation Commission, Michigan Asset Management Council.

The reporting of the inventory data elements in section 490.311(c) of the NPRM generated some questions. Fugro Roadware recommended that sections shorter than 0.1 mile be considered for other significant changes in the pavement inventory, such as change in pavement surface type and change in route identification (*i.e.*, where reference posts reset at county lines and overlapping highways start and end). The Georgia DOT urged FHWA to define the method for calculating cracking, rutting, and faulting, including differentiation of surface types. The Kentucky Transportation Cabinet requested clarification on how sections should be broken down when there are discontinuities in the route or surface type within a section. Considering these comments, FHWA revised sections 490.309(a) and 490.311(c)(2) to clarify that State DOTs are required to report all relevant<sup>67</sup> condition metrics for each pavement section. This means that each pavement section and all relevant condition metrics must be spatially coincident (*i.e.*, identical Route ID, Begin Point, and End Point values in HPMS). Recognizing that inventory data items do not perfectly align (or are not spatially coincident) with the pavement sections, FHWA revised section 490.311(c) and added section 490.311(d) in the final rule to clarify that State DOTs are required to report the three inventory data items (Through Lanes, Surface Type, and Structure Type) using the protocols in the HPMS Field Manual. In contrast to the section lengths for the measured pavement metrics, the section length for each of the inventory data items is not restricted to the 0.1 mile length. Instead, it reflects logical start and end points. These inventory data items will be tied to measured pavement conditions reported in the metrics using each State DOT's linear referencing system, as described in chapter 4 of the HPMS Field Manual.

Nine State DOTs<sup>68</sup> the Northeast Ohio Areawide Coordinating Agency and the Southeast Pavement Preservation Partnership provided comments expressing support for 0.1-mile intervals and noted that they collect and report data at 0.10 mile intervals and did not

<sup>67</sup> For asphalt pavement sections (Surface\_Type is 2,6,7, or 8), relevant condition metrics are IRI, rutting, and Cracking\_Percent; for jointed concrete pavement sections (Surface\_Type is 3,4,9, or 10), relevant condition metrics are IRI, faulting, and Cracking\_Percent; and for Continuously Reinforced Concrete Pavements (CRCP) sections (Surface\_Type is 5), relevant condition metrics are IRI and Cracking\_Percent.

<sup>68</sup> Hawaii DOT, Kentucky DOT, Maryland DOT, Oklahoma DOT, Oregon DOT, Missouri DOT, New Jersey DOT, Tennessee DOT and Washington State DOT.

<sup>60</sup> Ada County Highway District (ACHD), John Harvey, CEMEX USA, City of Vacaville, CA, Portland Cement Association, Metropolitan Transportation Commission, Oregon DOT.

see an undue burden with this proposed requirement. However, many of these State DOTs asked for more clarification on how they should address breaks in the system that would prevent collection at 0.10 mile lengths.

The NPRM contained substantial discussion about the importance of the 0.10 mile length data collection and reporting lengths in providing uniformity and increased accuracy in pavement condition assessment. The RIA prepared for the NPRM considered the increased costs of data collection and processing to comply with the requirements. Some State DOTs currently collect and report pavement condition at 0.10 mile intervals to the HPMS. An evaluation of the network level condition outcomes in these State DOTs using 0.20 mile section lengths indicated a minor difference in the percentage of Good condition pavements but a considerable difference in percentage of Poor condition pavements compared to the 0.10 mile length.

In the final rule, the 0.10 mile uniform pavement section data collection and reporting is retained because it is needed for a consistency in national performance reporting. Current data collection and processing technologies can easily accommodate it, and it is already an accepted practice in several State DOTs. Furthermore, this requirement does not impose restrictions on State DOT management programs. State DOTs can and should operate pavement management programs as they see fit.

Related to the section lengths, the commenters asked for more clarification on how State DOTs should address breaks in the system where collection at 0.10 mile lengths is not practical. These breaks occur due to uneven lengths in highway routes, interruptions to measurements by intersections, change in surface type, bridges, and similar locations where uniform 0.1 mile lengths are not possible. In the NPRM, allowance was made to report conditions for smaller pavement sections if needed, but that none should exceed 0.1 mile in length. It was noted in the comments and confirmed by examination of existing HPMS data that field measurements do not always align exactly with official State route maps. These deviations relate to the accuracy of global positioning devices and other field conditions that can result in sections slightly exceeding 0.1 mile lengths but always within a tolerance of approximately 50 feet. In the final rule, the intent is that State DOTs will report in 0.1 mile sections wherever possible, but are provided an allowance for

lengths up to 0.11 mile (580.8 feet) to accommodate the alignment issue. Therefore, FHWA revised sections 490.309(b)(1)(i)(C), 490.309(b)(2)(i)(C), 490.309(b)(2)(ii)(C) and added sections 490.309(b)(1)(iv)(C) and 490.309(b)(2)(iii)(C). These changes were made so that shorter than 0.10 mile pavement sections are permitted at the beginning of a route, end of a route, bridges, locations where surface type changes, or other locations where a section length of 0.10 mile is not achievable and specified that the maximum length of sections shall not exceed 0.11 mile (580.8 feet). Please note that as discussed in sections 490.309(a) and 490.311(c)(2), State DOTs are required to report spatially coincident (*i.e.*, identical Route ID, Begin Point and End Point values in HPMS) sections for all relevant<sup>69</sup> condition metrics to HPMS.

As stated above, the sections of condition metrics (*i.e.*, IRI, rutting, faulting, Cracking Percent, and PSR) are 0.10-mile long sections (shorter than 0.10 mile sections are permitted at the situation specified above) and not exceeding 0.11 mile, and all relevant condition metrics must be spatially coincident for each section. On the other hand, as discussed above, the section lengths of inventory data items (Through Lanes, Surface Type, and Structure Type) shall be in accordance with the protocols in the HPMS Field Manual so those data items do not necessarily spatially align with the condition metrics sections. However, in order to calculate measures (described in section 490.313) and to determine missing, invalid, or unresolved data (described in 490.313(b)(4)(i)), the data items (*i.e.*, inventory data items, and other related data items) which do not spatially align with condition metrics are required. So, for the purpose of calculating measures and determining missing, invalid, or unresolved data, condition metric data will be dynamically segmented with all three inventory data items (Through Lanes, Surface Type, and Structure Type), functional class data item (Data Item F – System in HPMS) and NHS data item (Data Item NHS in HPMS). To provide clarification on how sections should be broken down when there are discontinuities in the route in

<sup>69</sup>For asphalt pavement sections (Surface Type is 2,6,7, or 8), relevant condition metrics are IRI, rutting, and Cracking Percent; for jointed concrete pavement sections (Surface Type is 3,4,9, or 10), relevant condition metrics are IRI, faulting, and Cracking Percent; and for Continuously Reinforced Concrete Pavements (CRCP) sections (Surface Type is 5), relevant condition metrics are IRI and Cracking Percent.

responding to the comment from Kentucky Transportation Cabinet, FHWA differentiates between condition metric sections and dynamically segmented condition metric sections by adding a definition for condition metric sections in section 490.305. The FHWA defines a “Pavement Section” as a nominally 0.1 mile-long reported segment that defines the limits of pavement condition metrics required by FHWA. The revised sections 490.309(b)(1)(i)(C), 490.309(b)(2)(i)(C), 490.309(b)(2)(ii)(C) and added sections 490.309(b)(1)(iv)(C) and 490.309(b)(2)(iii)(C) used the term “pavement section.”

#### Requiring Full Extent Data Collection on the Full NHS for the Four Condition Metrics

The FHWA proposed that the data for all four condition metrics be collected on the full extent of the Interstate and non-Interstate NHS. This proposal introduced and increased the data collection burden for cracking, rutting, and faulting. Comments provided by AASHTO, ARC, the National Asphalt Pavement Association, and the State DOTs of Connecticut, Florida, Georgia, Kentucky, Minnesota, Mississippi, Missouri, and Oregon noted that the requirement for full extent data coverage is “unnecessary and excessive.” They also commented that the full extent data provides only marginally better insight into the system condition with significant financial consequences for State DOTs. Alabama DOT commented that sampling should be permitted on off-system routes, even if the end goal is to eliminate sampling on-system. The Mississippi DOT commented that the cost associated with the proposed requirement is not just in the data collection, but also includes review, analysis, maintenance, and reporting of the data. These requirements create additional burdens to the personnel resources of State DOTs. The Illinois DOT commented that automated crack mapping is still an emerging technology, and it is possible for there to be some inconsistencies in the way that States collect and report this data. They added that manual distress surveys of the entire NHS system are not a viable option.

The AASHTO and State DOTs of Connecticut, Georgia, Idaho, Minnesota, Montana, North Dakota, South Dakota, and Wyoming recommended allowing State DOTs to report metric data on samples in lieu of full extent. The AASHTO and Connecticut and Minnesota DOTs argued that sampling is a more cost effective approach than measuring the full extent. The Oregon



DOT commented that the full extent requirement is somewhat “understandable” for the Interstate System because there is a minimum pavement condition standard applied nationwide with significant financial consequences. Therefore, full extent measurement “makes sense” to ensure the most accurate data. However, the Oregon DOT recommended a sampling approach for the non-Interstate NHS because the system is not subjected to financial consequences. The Oregon DOT also stated that a sampling approach could also help avoid the inherent data errors associated with full extent IRI data where the data collection vehicle must stop at traffic lights. The Rhode Island DOT commented that State DOTs typically manage and maintain each direction of the Interstate System as separate roadways, but only report one direction to the HPMS. The Pennsylvania DOT commented that they collect data in both directions on divided non-Interstate NHS roads and requested clarification from FHWA on if they will only need to report one direction in the future. In addition, the commenter requested clarification on the frequency with which they need to report the data, since it is collected every year.

As discussed in the NPRM, reporting the full extent measurement for the whole NHS is important to determining pavement performance.<sup>70</sup> The final rule retains the language in section 490.309(b)(1) that requires State DOTs to collect and report IRI, rutting (asphalt pavements), faulting (jointed concrete pavements), and Cracking Percent annually for the full extent of the mainline highway Interstate System and collect data biennially and report data annually for the full extent of the non-Interstate NHS. As discussed in sections 490.109(d)(1) through (d)(3), State DOTs are required to collect non-Interstate NHS data every two years but State DOTs are required to report data for the entire non-Interstate NHS network to HPMS every year, hence, replacing the reported data from previous data collection cycle with the most recent data collected in HPMS. In response to Pennsylvania DOT’s question on the non-Interstate NHS, FHWA retains the language, as proposed in the NPRM, that only one direction (*i.e.*, inventory direction) data collection and reporting for non-Interstate NHS is required for the pavement metrics and inventory

data (sections 490.309(b)(2)(i)(D), 490.309(b)(2)(ii)(D), 490.309(b)(2)(iii)(D) and 490.309(c)(1)(ii)). Please note that the non-Interstate NHS pavement measures in section 490.313 will be computed using only the data referenced to the inventory direction of the non-Interstate NHS highways in HPMS. If a State DOT chooses to collect pavement data for the non-Interstate NHS on an annual basis, that State DOT will still meet the requirements in section 490.309(b)(2). In this case, the actual 2-year condition/performance (midpoint of a performance period) will be derived from the collected pavement data for the entire non-Interstate NHS in the second year of a performance period, and the actual 4-year condition/performance (end of a performance period) will be derived from the collected pavement data for the entire non-Interstate NHS in the fourth year of a performance period.

In response to comments suggesting use of a sampling approach, a recent statistical study<sup>71</sup> found that, even under controlled conditions, the variability of pavement data was substantial. A sampling program would require sample sizes approaching full data collection to provide a reasonable level of confidence in the results. It is not practical to implement this kind of a sampling program.

#### Using Structure Type To Identify and Exclude Bridges

In section 490.313(f)(1) of the NPRM, FHWA proposed that bridges would be excluded prior to computing all pavement condition measures by removing the sections where the Structure Type field value is coded as “1” in the HPMS. This was done to meet the statutory requirement (23 U.S.C. 119(f)(1)(A)) that pavement analyses must be done “excluding bridges.”

The AASHTO, Fugro Roadware, and the State DOTs of Alabama, Colorado, Connecticut, Georgia, New Jersey, Oregon, and Texas requested clarification on how the bridge limits would be removed from the 0.10 mile interval continuous pavement performance data, particularly where the bridge limits do not spatially coincide with the 0.10 mile pavement sections. Fugro Roadware recommended that areas with bridge structures simply be invalidated and identified as a bridge. The AASHTO and Connecticut and New York DOTs recommended flexibility for State DOTs to use

segments other than 0.10 mile at the bridges. Oregon DOT commented that they prefer not to include IRI data for the structures, but State DOTs have been required for several years to report IRI metric data for bridges under the current HPMS reporting requirements. Oregon DOT added that this redundant effort to provide pavement condition data on structures that is not being used by FHWA is inefficient. This creates concern because of the current environment where staff and money are scarce. The AASHTO and Illinois and Montana DOTs commented that there is a discrepancy between pavement data reporting requirements in the current HPMS and the proposed measure calculation process for handling pavement data on bridges. The Hawaii DOT commented that pavements on viaduct structures should be excluded from the pavement condition performance measures. The FHWA concurs since viaduct structures meet the definition for bridges and are excluded in the legislation.

The New Hampshire DOT commented that the Federal definition of bridges requires structures to be greater than 20 feet long. However, in New Hampshire there are several shorter bridges that often impact roughness just as larger structures do because many of them contain expansion joints or cause transverse cracking through expansion.

The FHWA has evaluated the comments regarding the methodology for excluding bridges for pavement condition measure calculation. The FHWA clarified several of the issues related to bridges on the NHS in the final rule.

First, in response to the comment from New Hampshire DOT, the term “bridge” used throughout subparts C and D is consistent with the definition proposed in section 490.405 of the NPRM. The FHWA agrees with New Hampshire DOT that structures less than 20 feet long could impact the condition of pavement sections. As discussed in the NPRM, FHWA recognizes that State DOTs may have different definitions for bridge. However, FHWA believes that these discrepancies would cause problems in calculating pavement measure consistently at the national level by excluding additional structures. The FHWA believes that the use of an established definition would continue to provide consistent and standardized data to be analyzed for the evaluation of State DOT and national progress. Therefore, FHWA moved the definition for the term “bridge” in subpart D (section 490.405) to subpart A (section 490.101) to use it in a consistent manner

<sup>70</sup> FHWA (2012). Improving FHWA’s Ability to Assess Highway Infrastructure Health Pilot Study Report, FHWA-HIF-12-049. <http://www.fhwa.dot.gov/asset/pubs/hif12049/hif12049.pdf>.

<sup>71</sup> Evaluation of Pavement Conditions on the Interstate System: Preliminary Summary, Rada 2015.



throughout the rule. As discussed in section 490.405, FHWA did not receive any substantive comments on the definition. The FHWA made an editorial revision to the definition in section 490.101 by striking the phrase “this section” and replacing it with the phrase “this part” to ensure that the definition in subpart A applies to both subparts C and D in the final rule.

The FHWA also clarifies that excluding bridges means that bridge limits will be determined by the coded values “Route\_ID,” “Begin\_Point,” and “End\_Point” for the Structure Type Data Item in HPMS where the value is coded “1.” Those determined bridge limits will not be used for calculating pavement performance measures.

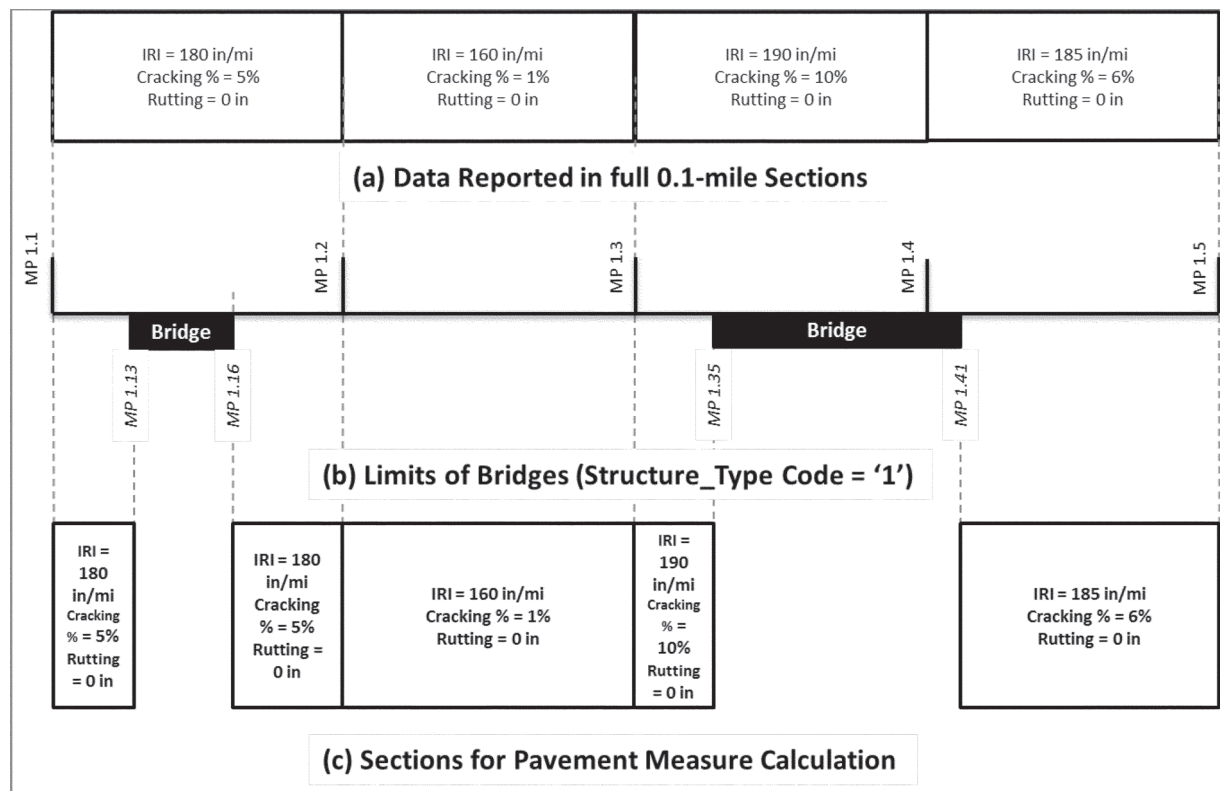
The FHWA agrees with the comments and recommendations from AASHTO and Connecticut and New York DOTs to provide flexibility for State DOTs to use segments other than 0.10 mile at the bridges. Therefore, FHWA revised sections 490.309(b)(1)(i)(C), 490.309(b)(2)(i)(C), 490.309(b)(2)(ii)(C), and 490.309(b)(ii)(C) and added sections 490.309(b)(1)(iv)(C) and 490.309(b)(2)(iii)(C) so that shorter than 0.10 mile pavement sections are permitted at bridges. The FHWA also provided flexibility for State DOTs in reporting pavement sections by either: (1) Reporting uniform section lengths of 0.10 mile regardless of presence of bridges (Figure 3); or (2) reporting shorter than 0.10 mile pavement

sections adjacent to bridges (Figure 4). The method of excluding the bridges for both options will be the same for both pavement section reporting options. The FHWA notes that if the first option is chosen, the reported IRI, rutting, faulting, and Cracking Percent metric values for a 0.10 mile pavement section will be influenced by the surface condition of the bridge deck. State DOTs should carefully examine the impact of bridge surface condition on the pavement condition measures when choosing the options on reporting pavement sections at (or adjacent to) bridges.

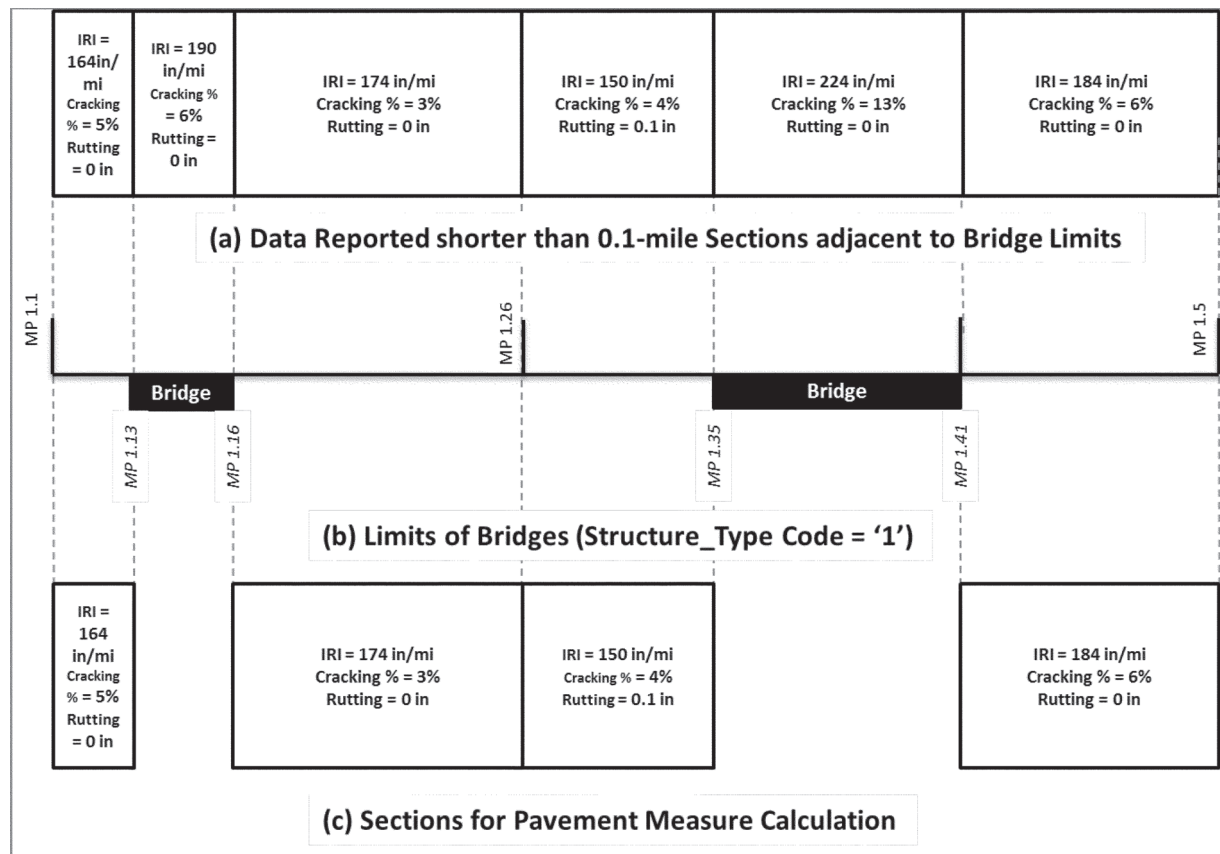
The FHWA cautions State DOTs in changing the way they report pavement sections at (or adjacent to) bridges between the time of target establishment and the time of progress evaluation. Such changes may alter the measures reported, which could then impact how an established target relates to actual measured performance. This difference could impact a State DOT’s ability to make significant progress toward achieving targets. Therefore, FHWA recommends that reporting of pavement section pavement sections at (or adjacent to) bridges is consistent between the HPMS data reporting cycles so that evaluating progress toward achieving target is consistent.

Finally, unlike the NHS limits and urbanized area boundary, FHWA did not propose that constant bridge limits would be used for excluding bridges

throughout performance period. The FHWA did not add language in the final rule specifying constant bridge limits to be used for excluding bridges throughout performance period. However, FHWA expects State DOTs to take necessary actions so that changes (both the number and the limits) in reported Structure Type Data Item in HPMS will be minimal between the data reporting cycles and have minimal impact on changes in pavement condition. In the discussion section for section 490.105(d)(3), ARC commented that changes to the NHS network are likely to be “infrequent and minimal” in impact when compared to the overall network extent. The FHWA expects the majority of changes in reported Structure Type Data Item in HPMS between data reporting cycles will be due to changes in NHS limits. For example, if a State DOT reports Structure Type Data Item in HPMS for only a small fraction of their bridges at the time of target establishment but reports for all bridges in subsequent years, the progress evaluation of targets for pavement condition measures will not be done in a consistent manner. The FHWA encourages State DOTs to take necessary actions to better integrate data between NBI and HPMS prior to establishing performance targets to minimize the impact of changes in HPMS between reporting cycles.



**Figure 3 – An example of 0.10 mile pavement section with data measured in full 0.10 mile sections**



**Figure 4 – An example of shorter than 0.10 mile pavement sections adjacent to bridge limits where data is measured separately for each section**

#### Travel Lane Required for Data Collection

In the NPRM, FHWA proposed that data be collected for all four condition metrics in the rightmost travel lane, or one consistent lane if the rightmost travel lane is not accessible. The AMPO stated that a lane-mile requirement could become prohibitively expensive. This commenter suggested a compromise similar to the Interstate requirement where data is collected in each direction for highways divided by a physical median. Similarly, the commenter said data for frontage roads, which serve NHS facilities, should be collected as well and be reported separately. The AASHTO and the Connecticut and Wisconsin DOTs commented that the rightmost lane may not be the most effective for data collection. They agreed that a consistent lane should be used, but preferred that State DOTs make the decision on the lane for data collection. The commenters expressed concerns with using the rightmost lane in mountainous areas. They argued that these lanes are often dedicated to truck travel and not representative of the other lanes on the roadway. They also expressed concern

with the challenges of collecting data in urban settings where the rightmost lane is often more congested than other lanes. The Tennessee DOT commented that they currently test the rightmost lane and supported the proposed requirement.

The FHWA considered these points and acknowledges that pavement conditions measured in dedicated truck lanes and congested lanes may not be representative of the overall condition of pavements in all lanes. The FHWA amended section 490.309(b) to allow other lanes to be used if the rightmost lane carries traffic that is not representative of the remainder of the lanes or is not readily accessible due to closure, excessive congestion, or other events impacting access.

#### Devices for Rutting Collection

The Florida and Oregon DOTs commented that the proposed process for data collection allows for rutting measurements using either a device that determines rutting from 5 points across the lane, or a device that determines rutting from 1,000 points or more across the lane. They argued that there is a large difference between the two methods. Fugro Roadware commented

that AASHTO R48–10 is not a reliable solution and should be removed as an option for pavement condition reporting. A review of AASHTO Standards R48–10 and PP–70 suggests that differences in precision exist. While the automated transverse profiling devices are the preferred method for measuring rutting, FHWA realizes that the devices are not yet universally adopted by State DOTs and that a significant number of State DOTs use the 5-point devices in their pavement programs. The NPRM provided for use of either device. No changes are made in the final rule.

#### Discussion of Section 490.311 Calculation of Pavement Metrics

The FHWA proposed the methodology to be used by State DOTs to calculate the IRI, cracking, rutting, and faulting metrics and the requirements to report these metrics and the three inventory data elements to the HPMS. The condition metrics are used, as defined in section 490.313, to classify pavements as being in Good, Fair, or Poor condition. These methods and metrics were derived primarily from



published standards<sup>72</sup> used in pavement design and adopted by a majority of State DOTs.

A number of commenters suggested additional or alternative metrics to be collected and identified challenges with the use of IRI in some local jurisdictions. The FHWA included discussion on these comments and the changes to the final rule in the previous sections of this rulemaking.

In the NPRM, FHWA proposed a requirement in section 490.311(b)(1) for State DOTs to determine the IRI metric for all NHS sections. As discussed in the previous section, a number of comments raised concerns with the collection of IRI in urban settings and on lower speed roadways. The FHWA used these comments to adjust the requirement of data collection to allow for an alternative method (PSR) to assess pavement condition on roadways where the posted speed limit is less than 40 mph. The PSR is to be determined using the method prescribed in the HPMS Field Manual, which is a visual overall assessment of pavement condition. The new provision also allows for State DOTs to utilize an alternative assessment method to estimate the PSR using a correlation that is approved by FHWA.

In section 490.311(b)(2)(i), FHWA proposed the method to calculate the amount of cracking in each asphalt pavement section. Many commenters noted inconsistencies with the proposed regulations and the HPMS Field Manual, the types of cracks to be included in the metric, and the consideration of cracks that have been sealed. In addition, several commenters noted concerns with the use of provisional AASHTO Standards that have been removed, as discussed previously for section 409.309 (under “Reference to AASHTO Protocols”). Fugro Roadware and the Ada County Highway District recommended the HPMS Field Manual metric of percent area of fatigue cracking for use on asphalt roads. The NCE commented that Cracking Percent may be overly simplistic for use in pavement management. The commenter states that Cracking Percent is a much simpler measure than PCI and adopting it in the rule as opposed to PCI “would be a step backwards.” The commenter also remarked that Cracking Percent is not widely used by either local agencies or States. In addition, the commenter expressed concerns with the proposed

thresholds for pavement measures, stating that they are inappropriate for local roads.

Some comments sought clarification on the location of cracks to be included in the metric or how the area of cracked pavement is to be calculated. The language in the HPMS Field Manual has been changed to more clearly state that the location of cracks to be included shall be limited to the wheel paths only. The Louisiana DOT suggested that a wheel path be defined as 3 feet wide to eliminate metric conversion errors. The HPMS Field Manual further clarifies the width and location of each wheel path is in English units. In addition, commenters asked for clarification on the types of cracks to be included in the metric. Suggestions were provided to consider the severity of the crack and to limit the metric to only fatigue related cracking. Stephen Mueller Consultancy suggested that the severity level of cracking (high, medium, or low) be added to the HPMS “Cracking Percent” reporting requirement to be used as one of the pavement condition rating thresholds in the regulation. In addition, the Maine Turnpike Authority commented that severity of cracking will be crucial for making a fair assessment of a road’s performance.

The intent of the metric is to only include load associated cracking in the wheel path. The HPMS Field Manual has been revised to clearly state that only fatigue (interconnected cracks) will be included in the metric. The FHWA believes that, for the purpose of the pavement measure being established through this rulemaking, an overall assessment of cracking is adequate to monitor system-wide performance. Consequently, FHWA does not feel that the cracking metric needs to consider the severity of the crack or cracking that is not related to pavement fatigue. The FHWA believes that the majority of fatigue generated cracking is in the wheel paths for asphalt pavements and therefore should be considered in the metric. The HPMS Field Manual has been revised to provide a clarification and guidance in reporting fatigue cracks, regardless of severity, in the metric.

Several commenters asked for clarification on the inclusion of sealed cracks in the cracking metric specifically related to asphalt pavements. The NEPPP noted that sealed cracks are often rated more severe using automated methods. The FP<sup>2</sup> corporation commented that crack sealing is an effective pavement preservation technique and should not be considered equal to an unsealed crack. The Rhode Island DOT

commented that sealed cracks should be considered in the metric.

In response to these comments, it should be noted that while sealing pavement cracks is an accepted practice for preserving pavements in Good condition, sealing cracks caused by fatigue does not restore structural capacity or alter the need for investment. The cracking performance metric in the final rule is predicated on measurement of fatigue cracking located only in the wheel path, regardless of whether the cracks are sealed. Therefore, no change was made in this final rule.

In section 490.311(b)(2)(ii), FHWA proposed methods to determine the rutting metric for asphalt pavements that permitted the use of either 5-point devices, scanning laser devices, or manual measurements. The Connecticut DOT asked for clarification on the accuracy of rutting measurement and Texas DOT suggested a minimum rut measurement spacing interval be required to determine the rutting average. The Michigan DOT suggested that if the precision level equaled the threshold for Good, then only pavements with zero rutting would be considered Good. The Texas DOT suggested an alternative metric that would represent the extent of rutting, in terms of the percentage of the section exhibiting rutting, to the proposed average value of rutting in a section. The Colorado, Florida, and North Carolina DOTs commented that the two devices identified in the NPRM for measuring rutting do not produce the same results. They recommended that only one device be permitted. The South Carolina DOT commented that it only has a 3-point laser system, and asked that FHWA consider the inability of State DOTs to perform the work in-house as required by the new rulemaking.

In consideration of these comments and inquiries made to the manufacturers of the measuring devices, the final rule clarified section 490.311(b)(2)(ii) and Item 50 of the HPMS Field Manual. The final rule requires the *average* rutting measurement to be computed to the nearest 0.01 inch, and that the measured rut values in each wheel path should be averaged first and then used as the basis for the final rutting metric calculation (average of the average wheel path ruts). The FHWA concurs with the comment by Texas DOT related to the minimum spacing for manual rut measurement at 12 inches and has included clarification in the HPMS Field Manual. However, FHWA does not concur with the suggestion to base the rutting measurement on the extent of rutting in a section instead of the averaged area of

<sup>72</sup> Mechanistic-Empirical Pavement Design Guide, A Manual of Practice, August 2015, 2nd Edition. American Association of State Highway and Transportation Officials, Washington, DC. Table 7.1

rutting. While there is merit to the suggested method, it conflicts with typical practices used in a majority of State DOTs and would require major reworking of planning and other performance models, such as the Highway Economics Requirements System, currently in use by FHWA. The final rule retains the use of averaged area as the basis for the rutting metric.

In section 490.311(b)(3), FHWA proposed the method to determine the cracking metric for CRCP. Commenters<sup>73</sup> requested a more clear description of how cracking, punch-outs, and patching should be measured to determine the percentage of the area for the metric. The Alabama DOT commented that the values for Item 52 are rounded to the nearest 5 percent under the current HPMS Field Manual, meaning that a result of 7.5 percent cracked is rounded to 5 percent and values up to 12.5 percent are rounded to 10 percent cracked. Louisiana DOT made similar comments regarding rounding in the HPMS Field Manual. Item 52 in the HPMS Field Manual was revised to clarify how cracking and other distresses in CRCP are to be measured and reported to the HPMS.

In section 490.311(b)(4)(i), FHWA proposed the method to determine the cracking metric for jointed concrete pavements. There were a number of comments<sup>74</sup> requesting clarification about the method of calculation, the types of cracks to be included, and the consideration of sealed cracks to the measure. Item 52 of the HPMS Field Manual (attached to the NPRM and posted to the docket) has been revised to clarify how the cracking metric for jointed concrete pavements is to be calculated and reported to the HPMS. There are no changes in the final rule language related to this issue.

In section 490.311(b)(4), FHWA proposed the method to determine the faulting metric for jointed concrete pavements from measured pavement profiles, although there is no prohibition from using manual methods. A number of comments<sup>75</sup> focused on the method to determine faults from pavement profiles, the determination of average faulting, and the accuracy of reporting. The NPRM proposed the use

of AASHTO Standard R36–13 as the method to identify faults, allowing for both automated and manual detection of faults. Several commenters<sup>76</sup> expressed concerns with the potential for bias using the automated method. They remarked that the automated method would only average joints that exhibit measurable faulting. They noted that AASHTO Standard R36–13 allows for variability in the method of detecting the location of joints, which causes variation in the reported faulting values.

In response to these concerns, FHWA has revised the section for Data Item 51 in the HPMS Field Manual to clarify how to calculate and report the average faulting to the HPMS.

The Michigan DOT, Alabama DOT, and Louisiana DOTD pointed out a conflict in the threshold proposed to determine Good faulting condition and the accuracy of reporting for the faulting metric. The Louisiana DOT stated that the proposed metrics for faulting appear to be based on pre-2000 historical faulting data, which ignores the significant increase in Truck Traffic and is relatively limited in scope. As Michigan DOT pointed out, if the precision of the reporting of average faulting for a section is 0.05, the process of rounding would eliminate the possibility of a Good classification unless the pavement faulting was zero. For example, if in a section one half of the measurements were 0.02 inch and one half of the measurements were 0.04 inch, the average would be 0.03 inch, which would be rounded up to 0.05 inch. Since the threshold is also 0.05 inch, this section would be classified as Fair per the NPRM, even though all of the measurements were in the Good range. A recheck with the manufacturers of the measuring equipment indicated that the devices would not have a problem providing an average measurement to the 0.01 inch precision. This would eliminate the problem. The basis for the faulting thresholds is the “end of design life” from the AASHTO Mechanistic-Empirical Pavement Design Guide (MEPDG),<sup>77</sup> not pre-2000 historical faulting data as suggested by Louisiana DOT.

In the final rule, FHWA revised the reporting accuracy of faulting from 0.05 inches to 0.01 inches to address conflicts associated with rounding in the determination of condition levels.

In section 490.311(c)(4) and (5), FHWA proposed due dates of April 15th

and June 15th to report metrics to the HPMS for the Interstate and non-Interstate NHS, respectively. The AASHTO, Alaska DOT&PF, Illinois DOT, Mississippi DOT, New York DOT, Oregon DOT, Rhode Island DOT, and Texas DOT objected to these due dates. They expressed concern with managing two different submission dates and the challenges of meeting the April 15th deadline for Interstates. The commenters felt that the earlier due date was not necessary and that all of the data should be submitted no later than June 15th. The Wisconsin and the Kentucky DOTs commented that they could meet the proposed April 15th deadline. The Washington DOT agreed with reporting metrics for the entire Interstate System by April 15th.

The FHWA included discussion in the NPRM to explain the reasoning for this proposed change. In summary, the accelerated due dates for Interstate pavements and NHS bridges is needed to administer the NHPP condition requirements prescribed in 23 U.S.C. 119(f). These provisions require FHWA to make a determination of compliance in a time frame that would allow for any resulting penalties to be applied by the next fiscal year. The April 15th deadline was proposed to provide sufficient time for the data to be reviewed and for any issues to be addressed before a determination is made. As discussed previously, the determination will be made based on HPMS data extracted on June 15th. State DOTs will have 2 months prior to June 15th to address any unresolved issues with the data submitted to HPMS. The final rule retains the due dates for HPMS submission as proposed.

#### Discussion of Section 490.313 Calculation of Performance Management Measures

The FHWA proposed the following:

- (1) The methods to calculate the condition levels for each of the four condition metrics;
- (2) the approach to address missing data;
- (3) a transition in the design of the pavement measure for non-Interstate NHS pavements; and
- (4) the method to calculate the section 490.307 pavement performance measures. The proposed approach utilized a method that considered the predominant condition level, represented by the four condition metrics, to determine the overall condition of each pavement section. The overall condition was proposed to be used to determine the percentage of the Interstate and non-Interstate NHS in Good and Poor conditions. In addition, the NPRM provided for a transition for non-Interstate NHS pavements that

<sup>73</sup> AMPO, Fugro Roadware, Virginia DOT, Illinois DOT, Louisiana DOTD, New Jersey DOT, Portland Cement Association.

<sup>74</sup> Colorado DOT, Connecticut DOT, Louisiana DOT, Michigan DOT, Mississippi DOT, New Jersey DOT, New Mexico DOT, New York DOT, Oregon DOT, Rhode Island DOT, Tennessee DOT, Wisconsin DOT, FP<sup>2</sup> Inc., NAPA, NCE, Portland Cement Association, Southeastern Pavement Preservation Partnership, and three private citizens.

<sup>75</sup> Michigan DOT, Wisconsin DOT, Iowa DOT, Louisiana DOT, PCA, Roadway Profile Users Group.

<sup>76</sup> Michigan DOT, Wisconsin DOT, Iowa DOT, Louisiana DOT, Ohio DOT (Tim McDonald), PCA, Roadway Profile Users Group.

<sup>77</sup> Mechanistic Empirical Design Guide, A Manual of Practice, Second Edition AASHTO 2015.



utilized only the IRI metric for the first performance period in determining the pavement measure. Finally, the NPRM also proposed an approach to consider all sections with missing data to be in Poor condition.

A number of comments were received on the use of the terms “Good,” “Fair,” and “Poor” and the condition metrics that were proposed to determine condition levels and the final pavement measures. The City of Seattle DOT suggested that FHWA define pavement condition in terms of 3 to 4 predominant assessment systems, arguing that it would provide additional flexibility. The FHWA considered these comments in the review of section 490.307. The discussion in section 490.307 of this preamble responds to comments and describes corresponding changes to the final rule.

In section 490.313(b), FHWA proposed thresholds for each of the four condition metrics that would be used to determine Good, Fair, and Poor condition levels. Several comments, primarily from local government agencies,<sup>78</sup> suggested that the thresholds be set differently for higher and lower volume roadways. The Louisiana DOT proposed that different performance metrics be identified for pavements that have higher traffic volumes. Maryland DOT generally agreed that the proposed criteria are appropriate, but suggested that alternative thresholds may be appropriate if friction is included as a metric, or if consideration is given to the causes of and repairs to structural cracking versus surface (functional) cracking. The Missouri DOT commented that one approach should be used for all roadways. The FHWA agrees with the comment from Missouri DOT and maintains that a standard definition of condition levels be used for all levels of roadway. The intent of MAP-21 is that State DOTs and MPOs establish targets that reflect different expectations for pavement conditions due to higher and lower traffic volumes and/or other reasons. For example, a State DOT may elect to establish the pavement performance condition target for high traffic volume roads to be significantly

smoother and less prone to disruption from maintenance activities than conditions on lower volume roads.

The FP<sup>2</sup> Corporation and State DOTs of Georgia, Rhode Island and Illinois expressed concerns regarding the weighting of pavement measures. They suggested that rather than weighting equally (except for rutting and faulting, which are combined), FHWA should consider weighting rutting and faulting differently. Fatigue cracking and rutting typically have a higher impact on the overall pavement condition rating and deterioration rate than does IRI or faulting. In addition, the State DOTs of Connecticut and Illinois argued that excluding bridges from the IRI calculation conflicts with the current HPMS Field Manual reporting practices. The State DOTs asked if the HPMS Field Manual will be updated.

The FHWA appreciates the concerns from FP<sup>2</sup> Corporation and the Georgia, Rhode Island and Illinois DOTs about the issues related to weighting of the pavement metrics. The FHWA recognizes that weighting is a typical practice for pavement management in many jurisdictions. However, the evaluation of pavement performance is more of a snapshot of existing conditions than a predictor of future conditions. Because of this, it is dependent more or less equally on each of the parameters described in the NPRM and maintained in the final rule. With reference to the bridges, it should be noted that the HPMS Field Manual made changes related to excluding bridges as required by 23 U.S.C. 119(f)(1)(A). Revisions to the HPMS Field Manual incorporated in the final rule retain these changes.

In section 490.313(b)(1), FHWA proposed IRI thresholds of less than 95 for Good condition and more than 170 for Poor condition with an exception for urbanized areas over 1 million in population. The IRI equal to 95 threshold reflects the generally accepted point where a road surface is no longer considered smooth; an IRI equal to 170 is the point where a road surface is considered unacceptably rough. A threshold of 220 for Poor was proposed for urbanized areas over 1 million in population, citing that a greater tolerance for increased roughness, lower travel speeds, utilities and construction difficulties existing in these areas. Several commenters<sup>79</sup> objected to this

provision. They argued that population should not be part of the definition of pavement roughness and that if adopted, it should be extended to all urban areas. The AASHTO and Connecticut DOT also requested clarification on the definition of urban, suggesting that urban areas should include more than the 1 million population threshold proposed in the NPRM. The Orange County Transportation Authority, PSRC, Road Profilers Users Group, Tennessee DOT, and Washington DOT suggested that the threshold for IRI on pavements be based on speed, not population. New Jersey DOT argued that the Interstate IRI should never be greater than 170, regardless of whether or not it is urban. CEMEX USA suggested that a “Poor IRI threshold of greater than 170 in/mile” be used for both rural and urban Interstate applications. Similarly, the Northeast Areawide Coordinating Agency, the Metropolitan Transportation Commission, and the Portland Cement Association agreed that urbanized and non-urbanized areas should have the same thresholds. Florida DOT and Illinois DOT also noted that there is potential confusion over census boundaries, adjusted/approved boundaries, and metropolitan planning areas.

The FHWA agrees that a separate threshold should not be established for urban areas, primarily because of the point raised by Florida DOT on confusion about boundaries for urbanized areas with a population over 1 million. The exception provided for in the NPRM (section 490.313(b)(2)) has been removed from the final rule. The change requires that all pavements will be considered in Poor IRI condition when the IRI is greater than 170.

In section 490.313(b)(2), FHWA proposed cracking thresholds of less than or equal to 5 percent for Good condition and greater than 10 percent for Poor condition. The New Mexico DOT commented that the definition of Cracking Percent is unclear, particularly for flexible pavements. In addition, the commenter stated the proposed threshold is too low. The Louisiana DOT commented that the thresholds for Cracking Percent be reviewed. The commenter stated that the usefulness of Cracking Percent is extremely limited. In addition, the commenter proposed that total length of cracks in a section be used as opposed to Cracking Percent. The AASHTO and Alabama DOT

DOT, Puget Sound Regional Council, Road Profilers Users Group, North East Ohio Areawide Coordinating Agency, CEMEX, USA, Brian Domsic, Ohio DOT, Larry Scofield.

<sup>78</sup> City of Fremont, CA, City of Santa Rosa, CA, City of Vacaville, CA, Colorado DOT, Contra Costa County, CA, County of Marin, CA, Metropolitan Transportation Commission, Oversight Committee for the California Local Streets and Roads Needs Assessment, Puget Sound Regional Council, Rural Counties Task Force, California DOT, Cemex USA, City of Vancouver, WA, Connecticut DOT, County of Los Angeles, Oregon DOT, South Dakota DOT, Seattle DOT, Orange County Transportation Authority, City of Portland, OR, City of Sacramento, CA, City of Gilroy, CA, City of Napa, CA, Town of Tiburon, CA, City of Spokane, WA, California Association of Counties, League of California Cities, Ada County Highway District.

<sup>79</sup> Alaska DOT&PF, AASHTO, CalTrans, Association of Municipal Planning Officials, Connecticut DOT, Idaho DOT, Illinois DOT, Iowa DOT, Louisiana DOT, Mississippi DOT, Missouri DOT, Montana DOT, New Jersey DOT, North Dakota DOT, Oklahoma DOT, South Dakota DOT, Tennessee DOT, Washington State DOT, Wyoming



commented that the proposed cracking thresholds for asphalt and jointed concrete pavements were more appropriate for Interstates and intended for project level assessments, citing references in the AASHTO MEPDG for

different design thresholds. The FP<sup>2</sup> Corporation proposed alternative cracking thresholds of less than 10 percent for Good condition and greater than 20 percent for Poor condition. In response to the comments, the threshold for Poor due to cracking is

relaxed in section 490.313(b)(2) of the final rule (Table 1). This change aligns with the AASHTO MEPDG<sup>80</sup> for arterial highways and reflects actual practices States DOTs use for design and management of NHS highways.

TABLE 1—CRACKING PERCENT PAVEMENT CONDITION RATING THRESHOLDS

Surface type	Metric	Metric range (percent)	Rating
Asphalt Pavement .....	Cracking Percent .....	<5 5–20 >20	Good. Fair. Poor.
Jointed Concrete Pavement .....	Cracking Percent .....	<5 5–15 >15	Good. Fair. Poor.
CRCP .....	Cracking Percent .....	<5 5–10 >10	Good. Fair. Poor.

No comments were received on the proposed cracking condition thresholds for CRCP (section 490.313(b)(2)(iii)). Therefore, they have been incorporated as proposed.

In section 490.313(b)(3), FHWA proposed asphalt pavement rutting thresholds of less than 0.20 inch for Good condition and greater than 0.40 inch for Poor condition. Several commenters<sup>81</sup> objected to these standards. They argued that the thresholds were not reasonable in areas where tire studs and snow chains are used and that 0.75 inch was a more acceptable threshold. Connecticut DOT suggested that increments of 0.25 inches be used for the thresholds, as opposed to the proposed 0.10 inch increments. Cemex USA and PCA commented that the rutting threshold of 0.10 should be the threshold for Poor condition as this is the level where hydroplaning would begin to occur. The Ohio DOT commented that the proposed rutting threshold of 0.10 would minimize the risk of hydroplaning. For 0.10 mile segments that have relatively uniform rutting, the threshold is appropriate, however, the threshold is inappropriate for 0.10 mile intervals that contain high stress areas.

The FHWA acknowledges the issues related to the use of tire studs and snow chains; however, as noted by Cemex

USA and PCA, the presence of rutting has a potential safety impact to users of the system regardless of the stress in the pavement. Although hydroplaning is possible at rutting level as low as 0.10 inch, the documented practices for State DOTs<sup>82</sup> identify rutting above 0.20 inch as cause for concern and above 0.40 inch as needing immediate attention. Moreover, these levels are supported by the design thresholds in the MEPDG,<sup>83</sup> which has been widely adopted by State DOTs. The final rule retains the proposed thresholds for asphalt pavement rutting.

In section 490.313(b)(3)(ii), FHWA proposed faulting thresholds for jointed concrete pavement of less than 0.05 inch for Good condition and greater than 0.15 inch for Poor condition. There were a number of comments<sup>84</sup> about this proposal. Some commenters argued that the thresholds were too stringent, particularly to define Good conditions. Some noted that there appears to be a conflict in the proposed threshold of 0.05 inch for Good condition and in the 0.05 inch accuracy of reporting for faulting (discussed earlier in section 490.311(b)). Others suggested that the 0.05 inch threshold for Good faulting would be difficult to maintain using sound construction, preservation, and maintenance activities. The suggested

thresholds for Good ranged from 0.05 inch to 0.25 inch.

In the NPRM, FHWA proposed a minimum requirement for reporting faulting in the HPMS to a precision level of 0.05 inch, reflecting measuring capabilities from legacy equipment no longer in use. Current devices are accurate to 0.002 inches<sup>85</sup> for individual measures and routinely deliver average values to a precision level of 0.01 inch. The HPMS permits State DOTs to report values more precisely than 0.10 inch and several report values to 0.01 inch or even 0.001 inch precision levels.

The FHWA revised section 490.313(b)(3)(ii) to provide a 0.01 inch precision level for reporting average faulting, reflecting the existing state of the practice. The FHWA also revised section 490.313(b)(3)(ii)(A) to set the threshold for Good at 0.10 inch, as discussed in the research.<sup>86</sup> The FHWA retains the threshold for Poor at 0.15 inch since the same research indicates that a highway with an average of this faulting level would be considered unsatisfactory to all users and not easily repaired.

In response to the concerns with collecting IRI data on lower speed roadways and the request from local governments to consider alternative condition assessment methods, FHWA

<sup>80</sup> The Mechanistic-Empirical Pavement Design Guide: A Manual of Practice from AASHTO (2008). AASHTO distributed this document to State DOTs upon publication. The document is currently available for purchase on the AASHTO Web site. A copy has been placed on the docket and is available for viewing by the public.

<sup>81</sup> AASHTO, Colorado DOT, Connecticut DOT, Rhode Island DOT, Oregon DOT and North Dakota DOT.

<sup>82</sup> American Association of State Highway and Transportation Officials, “Report of the AASHTO Joint Task Force on Rutting,” Washington, DC, 1989.

<sup>83</sup> Mechanistic-Empirical Pavement Design Guide, A Manual of Practice, August 2015, 2nd Edition. American Association of State Highway and Transportation Officials, Washington, DC. Table 7.1.

<sup>84</sup> AASHTO, Idaho DOT, Connecticut DOT, Tennessee DOT, Mississippi DOT, North Dakota

DOT, Oregon DOT, Rhode Island DOT, Virginia DOT, Louisiana DOTD, Portland Cement Association, Cemex USA, FP<sup>2</sup> Corporation, Fugro Roadware, and Southeast Pavement Preservation Partnership.

<sup>85</sup> This is also the standard sensor accuracy required in AASHTO Standard M328–10.

<sup>86</sup> Improving FHWA’s Ability to Assess Highway Infrastructure Health FHWA–HIF–13–042.

has established thresholds to define Good, Fair, and Poor condition levels based on PSR in section 490.313(c)(4). In developing these thresholds, FHWA utilized relationships developed by Michael Darter.<sup>87</sup> Mr. Darter's research suggests a rough correlation between estimated PSR values and measured IRI. In the final rule, the usage of PSR is restricted only to locations where posted speed limits are less than 40 mph on any NHS highway. The intent of this restriction is to provide an alternative method for areas with "stop-and-go" traffic and where constant speeds needed for proper operation of the measuring devices are not attainable. The PSR is calculated based on a defined process<sup>88</sup> that uses pavement conditions that include cracking, rutting, and faulting. The overall performance condition rating for these sections is determined directly from the reported PSR values. The comments from the local agencies<sup>89</sup> indicated that some used methods other than PSR, such as PCI, to rate

pavements. The final rule provides that equivalent methods to determine pavement condition can be used with prior approval from FHWA of the pavement data collection method and the technique to convert values to PSR.

In section 490.313(b)(4), FHWA proposed that roadway sections with missing, unresolved, or invalid data would be considered in Poor condition for each respective condition metric. The FHWA received comments from 41 groups<sup>90</sup> objecting to the proposal. The majority of the commenters expressed concern that the proposed action would give a false impression of the condition of the network and would mislead the public. Commenters identified common reasons for missing data, including actual or planned construction, road closures, disasters, and similar kinds of events. Most suggested that in any given year it would be unrealistic for a State DOT to reach more than 95 percent of their network, even under the best of conditions. The commenters offered alternative approaches to the proposed method, including: (1) An allowance of

the network to be missed for valid reasons; (2) using previous year reported metrics when data is missing; (3) base the measure only on the sections that were tested and (4) an allowance for construction projects that will improve pavement surface be automatically categorized as Good until a formal rating can be given. The Illinois and Washington DOTs did not specifically object to the proposal, but asked if segments under improvement would default to Poor.

In response, FHWA revised section 490.313(b)(4)(i) to allow no more than 5 percent of the network lane miles, not including bridges, unpaved and "other" surface types (such as cobblestone, planks, brick), to be represented with missing, unresolved, or invalid data due to the reasons noted in Table 2 below. The codes provided in Table 2 are to be documented in the HPMS submission whenever data is missing for any of the required relevant condition metrics or inventory data elements.

TABLE 2—HPMS CODES FOR MISSING DATA

Code	Description
1 .....	Construction—Roadway was under construction.
2 .....	Closure—Roadway was closed to traffic.
3 .....	Disaster—Roadway was located in an area declared as a disaster zone.
4 .....	Deterioration—Roadway is too deteriorated to measure; is already designated as "Poor" and is in the STIP for Capital Improvement Program purposes.
5 .....	Other—Please describe in comments.

The FHWA will determine that a reported section in HPMS has a missing, invalid or unresolved data on June 15, 2019, and annually thereafter for Interstate System (section 490.317(b)) and on August 15, 2018 and biennially thereafter for non-Interstate NHS (sections 490.109(d)(2) and 490.109(d)(4)). Once State DOTs submit data to HPMS by April 15 for the Interstate System (sections 490.311(c)(4) and 490.311(d)(2)) and by June 15 for the non-Interstate NHS (sections 490.311(c)(5) and 490.311(d)(3)), FHWA

will identify the data sections that do not meet the data requirements specified in sections 490.309 and 490.311(c) or do not provide sufficient data to determine its Overall Condition specified in sections 490.313(c) through (f) and FHWA will classify those data sections as "missing or invalid data." The FHWA will then notify State DOTs the list of those data sections classified as missing or invalid data. Upon FHWA notification, State DOTs will have an opportunity to rectify by FHWA data extraction dates (June 15 for the

Interstate System and August 15 for non-Interstate NHS) for determining minimum condition level for the Interstate System and significant progress determination for non-Interstate NHS. If a State DOT does not rectify FHWA identified missing or invalid data by FHWA data extraction dates, then those unrectified data will be classified as "unresolved data." The FHWA will issue guidance on classifying "missing, invalid or unresolved data."

<sup>87</sup> "Relationships between IRI and PSR", Al-Omari and Darter, ULIU-ENG-92-2013 (1992).

<sup>88</sup> Carey, W.N. and Irick, P.E. "The Pavement Serviceability Concept" Bulletin 250, Highway Research Board, 1960.

<sup>89</sup> City of Fremont, CA, City of Santa Rosa, CA, City of Vacaville, CA, Colorado DOT, Contra Costa County, CA, County of Marin, CA, Metropolitan Transportation Commission, Oversight Committee for the California Local Streets and Roads Needs Assessment, Puget Sound Regional Council, Rural Counties Task Force, California DOT, Cemex USA, City of Vancouver, WA, Connecticut DOT, County of Los Angeles, Oregon DOT, South Dakota DOT, Seattle DOT, Orange County Transportation

Authority, City of Portland, OR, City of Sacramento, CA, City of Gilroy, CA, City of Napa, CA, Town of Tiburon, CA, City of Spokane, WA, California Association of Counties, California League of Cities, South Jersey Transportation Planning Organization, Portland Cement Association, American Concrete Pavement Association, Northwest Pavement Management Association, Fugro Roadware, NCE, Brian Domsic, John Harvey.

<sup>90</sup> Alabama Department of Transportation, Alaska DOT&PF, California (Caltrans), Connecticut DOT, Delaware DOT, Georgia DOT, Idaho DOT, Iowa DOT, Kentucky TTC, Louisiana DOT, Maryland DOT, Michigan DOT, Minnesota DOT, Mississippi DOT, Missouri DOT, Montana DOT, New Jersey DOT, New York State DOT, North Carolina DOT,

North Dakota DOT, Oregon DOT, Pennsylvania DOT, Rhode Island DOT, South Dakota DOT, Tennessee DOT, Texas DOT, Virginia DOT, Washington State DOT, Wyoming DOT, AASHTO, AMPO, National Association of Regional Councils (NARC), New York State Association of Metropolitan Planning Organizations, Northeast Pavement Preservation Partnership, Southeast Pavement Preservation Partnership, Texas Association of Metropolitan Planning Organizations, New York Metropolitan Transportation Council, Atlanta Regional Commission, Community Planning Association of Southwestern Idaho, Knoxville Regional TPO, Fugro Roadware.

The percentage will be determined by total lane-miles with missing, invalid, or unresolved for the network divided by the total lane-miles of the network (excluding the lane-miles of bridges, unpaved surface type, and “other” surface type). As shown above, the criteria for determining missing, invalid, or unresolved values did not include the data completeness of Structure Type data item. However, FHWA expects State DOTs to report comparable data contained their NBI data. Please see discussion sections for 490.313(f)(1) related to excluding bridges. The FHWA plans to check the reasonableness of total lane-miles of bridges reported in HPMS with the reported NBI data.

The final rule prohibits reporting data collected during the previous data collection cycles because it does not accurately represent current pavement conditions required for reporting performance. Similarly, pavements under construction are not in “Good” condition and should not be reported as such. A review of recent submissions to the HPMS indicates that timely and complete data submissions have been problematic for some State DOTs, although 23 CFR 420.105(b) has required State DOTs to “provide data that supports FHWA’s responsibilities to the Congress and to the public” for many years. Failure to comply with this

rule results in inadequate data to report performance, as required in section 490.107 for the NHS, and insufficient data to enforce the provisions of 23 U.S.C. 150(c)(3)(iii) for minimum conditions on the Interstate System. Because of the importance of the Interstate System to demonstrate progress toward the national goals in 23 U.S.C. 150(b), the final rule requires that State DOTs have at least 95 percent of the Interstate pavement data available, and demonstrate that no more than 5 percent of the pavements are in Poor condition to avoid imposition of the penalties under section 490.317.

In addition, FHWA revised section 490.109(e)(4) so that FHWA will determine that a State DOT has not made significant progress toward the achievement of an NHPP target if a State DOT does not comply with the data completeness requirement under this section. (See discussion on section 490.109(e)(4) for more detail.)

Finally, the equation to calculate the measure was revised. It is now based on the total lane-miles collected and reported, not the total lane-miles in the system.

In sections 490.313(c) and (d) FHWA proposed that the method to determine the overall condition of the pavement be based on the conditions levels for each metric. The AMPO and the State DOTs

of Colorado and Illinois commented that the condition metrics should not be considered equally in the determination of overall condition. The North Dakota DOT commented that faulting and IRI are both indicators of roughness and therefore only one should be considered in the condition of jointed concrete pavements.

The FHWA notes that no data on pavement performance, as defined in the NPRM and in the final rule, exists at the present time. The MEPDG<sup>91</sup> suggests that the selected parameters are equally important in predicting future pavement conditions. The FHWA is committed to reevaluating the process through a future rulemaking once sufficient data has been collected. At this point there is no change in the proposed approach to determining the overall condition.

The FHWA established sections 490.313(c)(4) and 490.313(d)(4) to require the overall condition to be equal to the PSR condition level for roadways with posted speed limits less than 40 mph where State DOTs have reported PSR in lieu of the IRI, cracking, rutting, and faulting metrics. If a State DOT elects to collect PSR for pavement sections meeting these requirements, the overall condition of the section will be determined directly from the PSR values, as described in Table 3.

TABLE 3—OVERALL PAVEMENT CONDITION RATING THRESHOLDS USING PSR METRIC

Surface type	Metric	Metric range	Rating
All Pavements .....	PSR .....	≥4.0 ..... >2.0 and <4.0 ..... ≤2.0 .....	Good. Fair. Poor.

The FHWA proposed a transition period in section 490.313(e) for implementing cracking, rutting, and faulting metrics for full extent non-Interstate NHS pavement measures to allow State DOTs time to implement the data requirements. During the proposed transition period, the overall condition rating for all pavement types on the non-Interstate NHS would be based on IRI rating only.

The FHWA received one comment on the proposed transition approach. The Washington DOT disagreed with the proposed transition approach. The Washington DOT remarked that the sole reporting of full extent IRI may “exaggerate the Poor condition.” They provided an example in which IRI-based measure calculation yielded 17 percent

Poor, but the measure calculation using all four metrics yielded 6.4 percent Poor for their for their non-Interstate NHS network. The Washington DOT recommended that the overall condition rating during the transition period should be based on HPMS sample sections for all four metrics. They argued that their approach ensures consistency in condition reporting across the entire first performance period. They also stated that MPOs would have no choice but to adopt the statewide targets (section 490.105(f)(3)) because the HPMS sample data would not be sufficient to represent their metropolitan planning area, and therefore they would not be able to establish their own unique targets.

The FHWA appreciates the comment and the recommendation from Washington DOT. As stated in the NPRM, FHWA recognized that complete data for establishing baseline condition/performance for the first performance period will not be available for many State DOTs. The IRI metric data is already required for all NHS routes and can be used by State DOTs and MPOs to estimate the baseline condition/performance during the non-Interstate NHS pavement measure transition period. The FHWA understands Washington DOT’s concerns about the discrepancies between IRI and four metrics based measures. However, on a national basis, the pavement performance metrics using sampled sections of the NHS is substantially less

<sup>91</sup> The Mechanistic-Empirical Pavement Design Guide: A Manual of Practice from AASHTO (2008). AASHTO distributed this document to State DOTs

upon publication. The document is currently available for purchase on the AASHTO Web site. A

copy has been placed on the docket and is available for viewing by the public.



reliable and less representative of actual pavement conditions. For these reasons, FHWA retains section 490.313(e) in the final rule. (See discussion sections for sections 490.105(e)(7) and 490.109(e)(3) for more details on phase-in target establishment requirements and significant progress determination for the pavement condition measures.)

The New Jersey Department of Transportation requested clarification about how to report pavement conditions adjacent to bridges and other obstacles in the roadway. Alaska DOT noted that a significant portion of the NHS in Alaska is not paved and requested clarification about reporting conditions and rating performance on those routes.

Fugro Roadware recommended that sections with pavement surfaces that are not asphalt, PCCP, or CRCP be identified as alternative pavement types and should be excluded from the network length to determine the percent of Good, Fair, and Poor for Interstate and other NHS roadways.

In response to these requests, Section 490.313(f) includes exemptions for the sections of highway where the Structure is identified as a bridge and exempts sections that where the Surface Type is identified as unpaved or a type where pavement conditions cannot be measured, such as cobblestone or brick. The exemption for bridges conforms to the legislative requirement that measurement of performance not include bridges.

#### Discussion of Section 490.315 Establishment of Minimum Level for Condition of Pavements on the Interstate System

The MAP-21 requires the Secretary to establish minimum condition levels for pavements on the Interstate System to be maintained by State DOTs. The FHWA proposed the requirement that no more than 5 percent of Interstate pavements be classified as Poor. State DOTs are subject to a statutory penalty that would obligate a portion of NHPP funds and transfer a portion of STP funds to address Interstate pavement conditions if they fail to meet this minimum condition requirement for 2 consecutive years. Passage of the FAST Act in 2015 reduced the time from 2 consecutive years to 1 year.

The AASHTO and a number of State DOTs<sup>92</sup> submitted comments suggesting the following:

- States would not be able to meet the 5 percent requirement.

- FHWA should establish the threshold at 10 percent (or higher) or not establish a threshold at all.

- State DOTs should set their own requirement as part of the target setting process. The requirement should be distinct by region.

- The minimum pavement condition requirements should consider a range of pavement condition thresholds that accommodate regional variation.

- The rule should establish criteria that reflect a rational assessment of a State's Transportation Asset Management Plan.<sup>93</sup>

- Funds should not be diverted from one program to another as a penalty for not meeting the minimum condition standard.

- The FHWA should delay implementation of the minimum standard for 48 months from the effective date of the rule.<sup>94</sup>

- The FHWA should incorporate safety measures into the minimum condition for the Interstate System.

In the NPRM, FHWA cited a review of the reported conditions in recent HPMS submissions which suggested that at least 40 of the 52 jurisdictions could meet the 5 percent standard. The existing HPMS data is not as comprehensive as was proposed in the NPRM, but suggests that most State DOTs already prioritize funding to maintain Interstates at a high level. The FHWA believes that setting the threshold higher than 5 percent Poor is not justified by any available data and does not accomplish the national goal of keeping the Interstate System in a state of good repair. Acknowledging that there is virtually no existing data on performance, FHWA made a commitment in the NPRM to review the data submission from State DOTs for the first performance period and conduct a separate rulemaking to change the minimum standard if justified by the assessment of Interstate pavement conditions.

In response to the suggestion that State DOTs set their own minimum standard for Interstate highways, the statute clearly indicates the requirement for a national standard as part of the NHPP and specifically directs FHWA to establish it. The minimum standard is seen as the minimum tolerable condition for the Interstate system to meet the national goals set in the legislation.

Recent submissions to the HPMS suggested that State DOTs prioritized Interstate pavement conditions in every State and did not show significant differences in any region, except in Alaska. Alaska's recent submissions to HPMS showed rates of roughness, cracking, and rutting many times more than other parts of the country. The Alaska DOT&PF commented that Interstate highways in Alaska do not resemble Interstate highways elsewhere in the Nation. They cited the obvious climatic issues present in an Arctic and sub-Arctic environment such as embankment failures due to melting permafrost, cracking, and settlement due to extreme temperatures and the need for studded tire use for 7 months of the year. More importantly, Alaska DOT&PF noted that the Interstate routes were not constructed under the expansion of the National System of Interstate and Defense Highways funding that was used to construct much of the Interstate system in other States. When the Interstate System was designated in Alaska in 1976,<sup>95</sup> the routes typically were two lanes, did not have access control, and had been constructed under a variety of standards, none of which met Interstate requirements. In addition, Alaska DOT&PF requested that Section 490.315 only apply to "signed" Interstates. Furthermore, they requested that non-Interstate roads that are not paved or that have similar design features as Interstates should not be subject to the performance measures for pavement either.

Although Alaska DOT&PF requested an overall exemption from the minimum standard requirement, MAP-21 does not provide that option. However, the regional conditions and issues brought to light by the Alaska DOT&PF suggest that a greater allowance for Poor pavements is appropriate. A review of the recent HPMS submissions from Alaska DOT&PF suggests that a standard of no more than 10 percent Poor should be achievable and appropriate for the conditions, as provided for in section 490.315(b).

Commenters expressed mixed opinions on the establishment of a minimum condition threshold that would become more stringent over time. Several commenters expressed concern that pressure to meet a difficult minimum condition threshold may push State DOTs to implement a "worst-first" approach to pavement preservation, which would run counter to the asset management principles and

<sup>92</sup> New York State DOT, Connecticut DOT, Delaware DOT, Oregon DOT, Maine DOT, New Hampshire DOT, Vermont DOT, Ohio DOT, New York Association of Municipal Planning Organizations, Alaska DOT&PF, Connecticut DOT,

Georgia DOT, Texas DOT, New York Metropolitan transportation Council.

<sup>93</sup> New York DOT.

<sup>94</sup> AASHTO, Connecticut DOT, New Jersey DOT.

<sup>95</sup> 23 U.S.C. 103(c)(1)(B)(ii).

planning approach advocated by FHWA.<sup>96</sup>

However, AASHTO and the State DOTs of California, Louisiana, and Oregon recommended FHWA evaluate the effects of the national level performance measures and targets. They suggested that FHWA consider a graduated approach to setting minimum condition levels to ensure that these policies have a positive impact on management approaches.

The New York State DOT indicated that the establishment of penalties and minimum conditions should take into consideration sound performance and asset management policies. The New York State DOT suggested a delay until State DOTs adopt such measures.

The FHWA agrees that sound performance and asset management policies will aid State DOTs in establishing and achieving desired performance targets. However, it is clear that the intent of 23 U.S.C. 150(b)(2)(iii) and 23 U.S.C. 119(f)(1) is to keep Interstate pavements in a state of good repair in order to achieve the national goals outlined in the statute. The imposition of penalties that transfer Federal funds to Interstate programs is intended as a last resort for State DOTs that have not met this expectation. Delaying this effort would be contrary to the intent of the legislation.

In terms of implementation, the final rule establishes that State DOTs must start collecting Interstate pavement data for the HPMS according to the requirements in the rule not later than January 1, 2018, with the first reporting to HPMS not later than April 15, 2019. The FAST Act eliminated the “two consecutive reporting periods” provisions that were outlined in the NPRM. Therefore, the first evaluation of the Interstate pavement conditions for minimum condition levels will occur based on information in the HPMS database as of June 15, 2019. Delaying this determination is contrary to the intent of the FAST Act.

There are no changes to this section in the final rule except for modifying the 5 percent minimum requirement for Poor pavement condition to 10 percent in the State of Alaska.

#### Discussion of Section 490.317 Penalties for Not Maintaining Minimum Interstate System Pavement Condition

The FHWA proposed a methodology to annually assess the condition of Interstate pavements to determine

compliance with the minimum condition requirements in 23 U.S.C. 119(f). The MAP–21 specifically applies penalties to State DOTs that do not meet the minimum requirements for pavement condition. These penalties adjust the funding requirements for the Interstate System until the minimum condition standards are met.

The AASHTO and the NCPP outlined concerns from State DOTs over the application and subsequent consequences of not meeting the minimum condition requirements established by Congress and proposed by FHWA in the NPRM with the following arguments:

- Penalties should be eliminated in their entirety because they can lead to a “worst-first” management approach.
- The FHWA should allow longer timeframes for reporting periods before imposing mandatory penalties.
- The transition to the proposed full extent data collection requirements for pavements needs to be fully implemented before assessing penalties for minimum condition.
- Minimum condition and penalties should consider important factors like the current conditions for Interstate pavements or other stressors, such as impacts of State-specific climates.
- The FHWA should defer the imposition of any penalties and minimum condition thresholds to the fullest extent possible. Penalties should be a last resort and only utilized if a State DOT has not adopted sound performance and asset management policies and methods.
- The FHWA should be cautious if establishing a minimum condition goal based primarily on a limited amount of data.
- Attainment of minimum condition thresholds without sufficient and reliable Federal funding will be difficult for some States<sup>97</sup> and therefore detrimental to off-NHS needs.

Several State DOTs<sup>98</sup> agreed with AASHTO’s comments and suggested that no standard was needed or that the minimum condition standard should be set at a level that would be much easier to meet. The Michigan State Transportation Commission (STC) and Michigan’s Transportation Asset Management Council (TAMC) suggested that the “5 percent Poor” (or 95 percent Good/Fair) goal for Interstate pavements should be removed from the rule, arguing that setting such a high standard

for Interstate pavements will undermine State DOTs’ ability to improve the condition or ensure the performance of the miles of NHS pavement under their control.

Title 23 U.S.C. 150(a) contains a declaration of policy directing the NHPP to provide efficient investment of Federal transportation funds by focusing on national transportation goals. These goals emphasize the importance of national routes to the economy, safety, and other concerns of the Nation. By including the requirements for a minimum level of condition for Interstate pavements and the penalty provisions in 23 U.S.C. 119(f), the statute focuses on the Interstate system as an essential part of achieving the stated goals. The statute is also clear that redirection of Federal funds is a last resort when Interstate highways do not meet the expectations for state of good repair.

A review of the Highway Statistics table for 2013<sup>99</sup> indicates that the percentage of State maintained highways that are Interstate lane miles averages 2.5 percent, with no State having more than 7 percent of the State maintained lane miles on the Interstate System. Even in the worst case, maintaining the Interstate lane miles to achieve 95 percent in Fair or better condition would not require the level of investment that would drive a program to a “worst-first” approach. On the contrary, good maintenance and preservation, as currently practiced by many State DOTs, would minimize requirements for major investment on these routes, most likely well below the threshold of 5 percent in Poor condition.

With respect to the timelines for implementation, the final rule takes into account the time State DOTs will need to acquire data collection equipment or arrange for contract data collection in section 490.309(a).

The AASHTO and the concurring State DOTs<sup>100</sup> noted that there may be climatic and other stressors affecting conditions of Interstate pavements. This may be true, but there is no evidence other than State HPMS submissions to estimate whether this variation actually exists. An examination of the 2013 submissions to HPMS suggests that no distinct variations in IRI or other reported pavement characteristics based on regional conditions were reported except in Alaska. Based on this finding

<sup>97</sup> New York DOT, National Asphalt Paving Association (NAPA).

<sup>98</sup> New York State DOT, Connecticut DOT, Delaware DOT, Oregon DOT, Maine DOT, New Hampshire DOT, Vermont AOT, New York Association of Municipal Planning Organizations.

<sup>99</sup> Highway Statistics 2013 Table HM–60.

<sup>100</sup> Alabama DOT, Connecticut DOT, Kentucky DOT, New Jersey DOT, New York State DOT, Tennessee DOT, Texas DOT, Alaska DOT&PF, and Georgia DOT.

<sup>96</sup> State DOTs of Arkansas, Oregon and Mississippi, the Southern California Association of Governments, the Seattle Department of Transportation.

and the estimation that the majority of State DOTs will meet the minimum pavement condition standard, the final rule was not changed except to accommodate Alaska, as described above. However, due to the limited availability of data on performance, FHWA committed to reexamine the pavement performance parameters after the first performance period and open a new rulemaking effort to make changes, if justified.

The MAP-21 language ties together the requirements for asset management plans and performance measurement. As previously stated, State DOTs are expected to have an asset management plan and sound performance policies within a certain period of time designated in the respective rules. In establishing the implementation schedule for data collection and performance evaluation under subpart C, care was taken to give State DOTs enough time to develop and implement the necessary programs to ensure pavement performance.

The FHWA agrees with AASHTO that the imposition of the penalty is a last resort effort necessary to ensure acceptable performance of the Interstate System to achieve the national goals for the NHPP.

#### Discussion of Section 490.319 Other Requirements

The FHWA proposed the Data Quality Management program requirements in section 490.319(c) to implement 23 U.S.C. 150(c)(3)(A)(iv) for pavement condition data. As FHWA indicated in the NPRM, the structure of the data quality Management Program is left up to State DOTs but this section proposed that the plan must have methods to ensure that equipment is working properly, people are trained, data quality is being checked, and that a method of error resolution is documented.

However, AASHTO and a few State DOTs<sup>101</sup> objected to the language. They suggested that a data quality management program was not called for in the legislation; that no specific details are mentioned in the legislation; and that there is concern with the variability among FHWA Division Office approvals. The Oregon DOT requested clarification on which FHWA office would review and approve the Data Quality Management Program, noting that the requirement for a State DOT to seek approval for any change to the

Program seemed excessive. In their joint letter, the State DOTs of Idaho, Montana, North Dakota, South Dakota, and Wyoming suggested that the requirements for Data Quality Management be revised so that States must certify they have a data quality management program and provide a description to FHWA. Conversely, the Alaska DOT&PF supported the provision to have a Data Quality Management Program and suggested that the Program be approved prior to States using the data for the performance measures.

The FHWA disagrees with the comments from AASHTO and those concurring State DOTs. The FHWA believes that MAP-21 gives it the discretion to establish requirements for implementing 23 U.S.C. 150(c)(3)(A)(iv). The FHWA also believes the data quality management program requirements in section 490.319(c) will ensure quality data and provide a sufficient level of consistency in report expectations. The FHWA believes the proposed language is consistent with the nine principles<sup>102</sup> in the NPRM preamble, which were considered in the development of the proposed regulation. Additionally, a recent FHWA study<sup>103</sup> on data quality indicated that most State DOTs have implemented parts of programs to ensure data quality but have not documented or formalized their use in the data collection process. As stated in the NPRM, the intent of this section was to ensure that the important step of formalization in the program occurs. The FHWA retains the language that leaves the content of the data quality management plan up to State DOTs because FHWA recognizes that every State DOT has unique methods, needs, and opportunities in the data collection. The FHWA approval of each State DOT's data quality management plan is to be based on its ability to deliver the specific outcomes identified in the NPRM and retained in the final rule. Specific guidance will be provided to Division Offices to ensure consistency in the Pavement Data Quality Plan requirements.

#### C. Subpart D National Performance Management Measures for Assessing Bridge Condition

##### Discussion of Section 490.401 Purpose

To implement the provisions of 23 U.S.C. 150(c)(3)(A)(ii)(III), FHWA proposed a statement of purpose which required the establishment of performance measures for State DOTs to use to assess the condition of bridges carrying the NHS which includes on- and off-ramps connected to the NHS. This is done to carry out the NHPP. The FHWA revised section 490.401 to provide clarity as to which highway bridges are subject to this regulation.

The FHWA received two comments on section 490.401. The Oregon DOT argued that the proposed rule would create a conflict by giving the Federal Government the authority to interfere with a State DOT's ability to independently manage its highway infrastructure assets.

The Virginia DOT provided a statement of support. The Virginia DOT argued that the proposed rule would promote a preservation approach to managing highway bridges and is an improvement over the "worst-first" approach.

The overall purpose of this rule and the underlying statutory provisions is to ensure that Federal transportation funds are efficiently invested and that the condition of highway infrastructure assets are maintained in a state of good repair, while increasing accountability and transparency of the Federal-aid highway program. (See 23 U.S.C. 150(a) and (b).) Although recipients of Federal-aid highway funds are expected to make transportation investments with a focus on national goals, the authority to establish performance targets and make project selections is still maintained by State DOTs.

The FHWA retains the language in section 490.401, as proposed in the NPRM, with a minor revision that provides clarity as to which highway bridges are subject to this regulation. The stated purpose is consistent with statutory language in MAP-21 and clear in the purpose of the performance measures.

##### Discussion of Section 490.403 Applicability

To implement the statutory provisions under 23 U.S.C. 150(c)(3)(A)(ii)(III), FHWA proposed that subpart D be applicable to bridges carrying the NHS which includes on- and off-ramps connected to the NHS.

The FHWA received comments from AASHTO, ARC, and 12 State DOTs (Arkansas, Colorado, Connecticut, Iowa,

<sup>101</sup> Alaska DOT&PF, Connecticut DOT, Idaho DOT, Montana DOT, New York DOT, North Dakota DOT, Oregon DOT, South Dakota DOT, Washington DOT, Wyoming DOT.

<sup>102</sup> Nine principles used in the development of proposed regulations for national performance management measures under 23 U.S.C. 150(c), [www.regulations.gov](http://www.regulations.gov), Docket FHWA-2013-0053.

<sup>103</sup> "Practical Guide for Quality Management of Pavement Condition Data Collection" FHWA-HIF-14-006.



Maine, Michigan, Missouri, New Hampshire, North Dakota, Oklahoma, Tennessee, and Vermont) generally stating that State DOTs should not be responsible for the reporting of data, establishment of targets, asset condition, and managing of assets that are beyond their control.

The FHWA retains the language in section 490.403 with a minor revision that provides clarity as to which highway bridges are subject to this regulation. Section 23 U.S.C. 150(c)(3)(A)(ii)(III) of Title 23 of the U.S. Code requires the establishment of measures for “States to use to assess the condition of bridges on the National Highway System” for the purpose of carrying out the NHPP. The Section does not define the terms “National Highway System” or “States.” The MAP-21 did not provide FHWA with the authority to change the definition of State or NHS. Thus, the definitions in 23 U.S.C. 101(a)(15) and 23 U.S.C. 101(a)(25) have been used in this Rule. Therefore, a State DOT is not alleviated of the responsibilities under sec. 150 for the NHPP. As stated in the NPRM, FHWA recognizes that there is a limit to the direct impact State DOTs and the MPOs can have on the performance outcomes within the State and the metropolitan planning area, respectively. The FHWA encourages State DOTs to consult with relevant entities (e.g., Federal Land Management Agencies, MPOs, local transportation agencies, and tribal governments) as they report performance data and establish targets. Consultation will help State DOTs to better assess condition of bridges carrying the NHS, which includes on- and off-ramps connected to the NHS and better identify and consider factors outside of their direct control that could impact future condition/performance. (See discussion on ownership in discussion section for section 490.105(d).)

The FHWA received comments from six State DOTs (Connecticut, Illinois, Iowa, Michigan, Minnesota, and Missouri) generally stating that the applicability of subparts C and D should be consistent. Specifically, they commented that the regulations apply only to mainline highway bridges carrying the NHS and that highway bridges on on- and off-ramps that connect to the NHS should not be subject to these regulations.

Historically, FHWA has provided guidance stating that ramps are to be considered to be the same functional classification as the highest facility

served.<sup>104</sup> Although the NHS is not solely based on functional classification, but is instead defined by 23 U.S.C. 103, the practice of assigning the highest system served for a ramp is consistent with the FHWA guidance referenced above. Therefore, this section is applicable to the NHS (defined by 23 U.S.C. 103), which includes highway bridges that carry the NHS and bridges on on- and off-ramps connecting to NHS.

The FHWA received comments from five State DOTs (Connecticut, Illinois, Mississippi, Virginia, and Washington) seeking clarification on their responsibility for highway bridges on the NHS that cross the border with a neighboring State. One commenter expressed concern that there would be a “double-counting” of the deck area of highway bridges on the NHS when the bridge performance measures are calculated. Another commenter recommended that the responsibility of a highway bridge that crosses a border with a neighboring State should be based on the percentage of ownership. The commenter further stated that a State that does not own or share such a bridge should not be held responsible.

In regards to the responsibility for highway bridges carrying the NHS that cross a border with a neighboring State, State DOTs should refer to the above discussion on responsibility for the reporting of data, establishment of targets, asset condition, and managing of assets that are beyond the control of State DOTs and MPOs. State DOTs should also refer to the discussion on ownership in the discussion of section 490.105(d). Based on these previous discussions, border bridges are to be regarded in the same manner as any other highway bridge carrying the NHS that is within a State’s boundaries.

In calculating the deck area, the total deck area of all the border bridges that cross a State’s border will be included in the calculation of an individual State DOT’s bridge performance measures and the percentage of the deck area of bridges classified as Structurally Deficient. However, there will be no “double-counting” of deck area as FHWA has not proposed a summation or aggregate calculation of all State DOTs’ bridge performance measures or percentage of the deck area of bridges classified as Structurally Deficient into national percentages.

<sup>104</sup> U.S. Department of Transportation, Federal Highway Administration. Highway Performance Monitoring System, Guidance for the Functional Classification of Highways <http://www.fhwa.dot.gov/policy/ohpi/hpms/fchguidance.cfm>.

The New York DOT suggested that an exception to the bridge performance measures be established for very large or historic bridges as they would “never be replaced” and “should be treated as perpetual maintenance exceptions.” Title 23 U.S.C. 150(c)(3)(A)(ii)(III) provided no exception for certain sized or aged highway bridges. Therefore, any highway bridge that carries the NHS or ramp that connects to the NHS, and meets the section 490.405 definition of a bridge, is subject to the requirements of subparts A and C.

#### Discussion of Section 490.405 Definitions

To implement 23 U.S.C. 119(f)(2) and 23 U.S.C. 150(c)(3)(A)(ii)(III), FHWA proposed definitions for the terms “bridge” and “structurally deficient.”

The FHWA did not receive any substantive comments regarding the definition for bridge. However, as discussed in section 490.309 (Using Structure Type to Identify and Exclude Bridges), FHWA moved the definition of bridge from this section to subpart A (i.e., section 490.101) to ensure the term is used in a consistent manner throughout this rule.

The FHWA received comments from AASHTO (with support from Michigan and Maryland DOT), NYSAMPO and 12 State DOTs (Alabama, California, Connecticut, Idaho, Montana, New York, North Carolina, North Dakota, South Dakota, Texas, Washington, and Wyoming) suggesting changes to the proposed definition of the bridge classification “structurally deficient.” One suggestion was to lower the threshold for the NBI Items (Items 58-Deck, 59-Superstructure, 60-Substructure, and 62-Culverts) that are used to classify a bridge as structurally deficient. The suggestion was to lower the threshold from a condition rating of four—poor condition, which is described in FHWA’s Recording and Coding Guide for the Structure Inventory and Appraisal of the Nation’s Bridges as Poor: advanced section loss, deterioration, spalling, or scour, to three—serious condition which is described as loss of section, deterioration, spalling, or scour have seriously affected primary structural components; local failures are possible; fatigue cracks in steel or shear cracks in concrete may be present.

Additional suggested changes included removing NBI Item 58-Deck from the calculation of the classification, and changing the definition and calculation of “Structurally Deficient” to be the same as the performance measure “Percentage

of NHS bridges classified as in Poor condition.”

The Missouri and New Hampshire DOTs supported the proposed definition. The Colorado DOT noted that the proposed definition is identical to the historical definition. Three other State DOTs (Connecticut, Iowa, and New Jersey) suggested discontinuing the use of the classification and developing a new term that better serves the purpose of the provisions. The Georgia DOT requested clarification on the differences between the classification of structurally deficient and the bridge performance measure of Poor. The Oregon DOT commented that the proposed definition for the classification of structurally deficient was more “amenable to element level” bridge data rather than bridge components (*i.e.*, deck, superstructure, substructure, and culverts). The PSRC recommended that the calculation of the bridge performance measure for Poor equate to the proposed definition and methodology for the classification of structurally deficient.

The FHWA retains the term “structurally deficient” in the final rule as the statutory language in MAP-21 uses it. Section 119(f)(2) of Title 23 U.S.C. requires FHWA to determine the total deck area of bridges in each State on the NHS that have been classified as structurally deficient, and to apply a penalty, when necessary, based on an established percentage of that classification. The statutory language does not grant FHWA the authority to disregard the use of the term “structurally deficient.”

The FHWA revised the definition and methodology for the classification of structurally deficient so that it equates to the performance measure of bridges classified as in Poor condition. The revision also addresses the concern that the proposed definition was more amenable to element level bridge data rather than the NBI component level data that is used for classification. The revised definition considers only the physical condition of the bridge. As proposed in the NPRM, the classification of structurally deficient goes beyond the metrics of the bridge performance measures and physical condition. It also considers the level of service the bridge provides as compared to a bridge that is built to current standards.

Equating the classification of structurally deficient with bridges classified as in Poor condition provides consistency as it aligns the NHPP provisions for the condition of NHS bridges (23 U.S.C. 119(f)(2)), which use the classification of structurally

deficient. Section 150(c)(3) of Title 23 of the U.S. Code requires the establishment of performance measures for State DOTs to use to assess the condition of bridges on the NHS and for the purpose of carrying out the NHPP.

Additionally, the differences in the population of bridges on the NHS that are classified as structurally deficient by the historical definition and method in NPRM versus in Poor condition are minimal as the calculation methods are similar. According to FHWA’s NBI for the 10-year period of 2005 to 2014, the maximum difference between the methodology proposed in the NPRM and the one in the final rule by both the percentage of number of bridges and percentage of deck area of bridges is 0.2 percent. Lowering the threshold for NBI Items 58, 59, 60, and 62 from a condition rating of four to three and removing NBI Item 58 from the calculation of the classification of structurally deficient were not considered. This would represent fundamental changes to a historical classification method and would result in vastly different populations of bridges carrying the NHS, which includes on- and off-ramps connected to the NHS, than what was intended to be addressed by 23 U.S.C. 119(f)(2).

The Minnesota DOT suggested providing “clear and concise definitions” for the terms so that “there is consistency in the interpretation” of the regulations. The FHWA agrees and believes that clarity is provided in the regulations.

The Missouri DOT requested the NBI algorithms used to calculate and determine if a highway bridge is to be classified as structurally deficient. As discussed above, FHWA revised the definition and methodology for the classification of structurally deficient so that it is the same calculation used for classifying bridges as in Poor condition. The historical NBI algorithms that were used to calculate NBI Items 67 (Structural Evaluation) and 71 (Waterway Adequacy) will not be used.

#### Discussion of Section 490.407 National Performance Management Measures for Assessing Bridge Condition

To implement the statutory provisions under 23 U.S.C. 150(c)(3)(A)(ii)(III), FHWA proposed two performance management measures for assessing the condition of bridges on the NHS: (1) Percentage of NHS bridges classified as in Good condition; and (2) percentage of NHS bridges classified as in Poor condition.

The ASCE and the Georgia DOT supported the proposed section.

The AASHTO expressed general support of the proposed three classifications and two performance management measures for assessing the condition of bridges on the NHS. However, AASHTO, AMPO, and eight State DOTs (Idaho, Montana, Oregon, North Dakota, Rhode Island, South Dakota, Texas, and Wyoming) recommended that additional language be provided to the classifications and performance measures to communicate and focus on the needs of bridges rather than the condition. For example: (1) Good condition bridges should be described as bridges that need routine or cyclic maintenance; (2) Fair condition bridges should be described as bridges that need condition based preventative maintenance; and (3) Poor condition bridges should be described as bridges that need rehabilitation and or replacement.

While providing such additional language may be beneficial when communicating the needs of bridges, the recommended language may be interpreted as limiting the types of projects that can be performed on bridges in certain conditions. The determination of what projects or activities to perform on a bridge is at the discretion of its owner. The Federal-aid highway program provides such flexibility. Eligible bridge projects, regardless of the condition of the bridge, are defined in each of the programs. For example, under the NHPP, the list of eligible projects that includes bridge activities, can be found under 23 U.S.C. 119(d). Although flexibility exists, it should be noted that as part of performance management, recipients of Federal-aid highway funds must make transportation investments to achieve performance targets that make progress toward national goals. The national performance goal for bridges is to maintain their condition in a state of good repair.

The additional language is also inconsistent with the statutory language that requires FHWA to establish performance measures. In 23 U.S.C. 150(c)(3)(A)(ii)(III), the Secretary is required to establish measures for States to use to assess the condition of bridges on the National Highway System. A bridge condition measure describes the existing, in-place bridge’s physical condition as compared to its as-built physical condition. The statute does not provide that an assessment of needs such as maintenance, rehabilitation, or replacement be used to measure the performance of bridges. Instead, “the condition of bridges” is the performance measure. Therefore, FHWA retains the language in the final rule for the three

classifications and two performance management measures for assessing the condition of bridges carrying the NHS, which includes on- and off-ramps connected to the NHS.

The AMPO, California DOT, California State Association of Counties, COMPASS, Metropolitan Transportation Commission, the NYMTC, and an anonymous citizen suggested that additional factors other than those proposed (NBI Items 58, 59, 60, and 62) be included in the calculation of the performance measures. Suggestions included factors that considered level of use, vehicle speed on the bridge, and seismic and scour vulnerability.

As stated above, the statute that required the establishment of performance measures for bridges on the NHS did not provide for any factors other than “condition.” Level of use, such as average daily traffic and vehicle speed, are not considered measures of the condition of a bridge. Instead, these factors are measures of functionality. Such measures are used to describe a bridge in relation to the level of service it provides to its highway. Similarly, seismic and scour vulnerability are not considered measures of condition. They would be considered measures of risk for certain types of extreme events. A bridge’s physical condition is one of many factors (*e.g.*, bridge design, location, and others) that should be considered when determining vulnerability or risk to extreme events. However, vulnerability and risk to extreme events are not measures of condition. Therefore, FHWA retains the language for the metrics to be used in calculating the bridge performance measures.

The Connecticut DOT commented that the performance measures should not be weighted only by deck area as this may incentivize bridge owners to prioritize plans and projects for larger bridges over smaller ones. The Connecticut DOT also suggested that having an additional set of performance measures that are weighted by number of bridges instead “will ensure that the State also addresses smaller bridges.” This dual set of performance measures “will be helpful for both States and FHWA to assess and report a more accurate description of the nation’s infrastructure.” The AMPO had a similar comment stating, “There is uncertainty about the use of percent of bridge deck area instead of percent of all bridges. This is probably more of a concern for States with longer bridges (*i.e.*, Louisiana as opposed to Montana). For instance if the Lake Pontchartrain Causeway (26.2 miles) ended up rating as Poor this ends up being the

approximate equivalent of 8,300 culverts being rated as Poor. The end result might force Louisiana to improve the Causeway at the expense of other work.”

Requiring additional bridge performance measures weighted by the number of bridges would be inconsistent with one of the nine principles in the NPRM preamble which were considered in the development of the proposed regulation (Minimize the Number of Measures). While performance measures weighted by the number of bridges provide an amount of bridges in certain conditions, performance measures weighted by deck area provide a greater perspective on the extent of the condition of bridges as the size of a bridge is taken into account.

Therefore, FHWA retains the language for the two performance measures for assessing the condition of bridges on the NHS, as weighting the performance measures by deck area provides more information through a minimum number of required performance measures. The FHWA recognizes that performance measures based on deck area may influence State DOTs to prioritize plans and projects for larger bridges over smaller ones so as to achieve improved conditions at a greater rate. However, FHWA is confident that this and the related asset management rulemaking to establish minimum standards for State DOTs to develop their bridge management systems and investment strategies will ensure that State DOTs choose the most efficient investments for Federal transportation funds. This final rule, in combination with the State Asset Management Plan rule (RIN 2125–AF57), will ensure that State DOTs focus on national transportation goals, increase accountability and transparency, and improve investment decisions regardless of bridge size.

The Idaho DOT recommended that a statement be provided in the final rule to clarify that States and MPOs are not precluded “from implementing (whether already in effect or new) systems that include assets in addition to NHS assets, such as non-NHS bridges, provided that the State meets Federal requirements as to the assets that are required to be included in the Federal performance management system by the Federal rule. Moreover, as to non-NHS assets, the rule should not require a State to have to utilize the specifics of the Federal rule.” The Oregon DOT provided a similar comment stating, “States must consider all bridges regardless of the system when setting up maintenance, preservation, or replacement programs. State plans to

use available transportation funds should be developed based on priorities that consider the system, traffic volume, and condition, but non-NHS needs must also be addressed in order to maintain economic viability and mobility across an entire transportation system. If the national measures are really intended to be used to measure system improvement resulting from investments, both NHS and non-NHS systems should be reported so a comprehensive view of a state’s investment strategies will be presented.”

The applicability of subpart D is described in section 490.403. Subpart D is only applicable to bridges carrying the NHS, which includes on- and off-ramps connected to the NHS. Therefore, provided that the requirements of this final rule are met, State DOTs and MPOs may go beyond these minimum requirements when implementing a performance management system or program. (See the Final Rule for Asset Management Plan for further information on implementing a performance management program on non-NHS bridges.)

The Ohio DOT inquired about the process by which State DOT bridge performance targets will be submitted to FHWA; the criteria for changing a bridge performance target; and whether performance targets are to be approved by FHWA.

The requirements for reporting on performance targets are described in section 490.107. In general, State DOTs submit their performance targets to FHWA through an electronic template to be provided by FHWA. The process for adjusting a 4-year target is described in section 490.105 and the required reporting for that adjusted target is in section 490.107. If a State DOT decides to adjust its 4-year target, it must include a discussion in their Mid Performance Period Progress Report on the basis for the adjustment and how the adjusted target supports expectations documented in longer range plans (*e.g.*, State asset management plan and the long-range statewide transportation plan). Regarding FHWA approval of performance targets, MAP–21 did not provide FHWA the authority to approve or reject State DOT and MPO targets.

The Metropolitan Transportation Commission commented that it “uses and supports the use of the National Bridge Investment Analysis System to analyze bridge maintenance needs.” They also “recommended that FHWA make the tool available and provide appropriate training.”

The NYSAMPO expressed concern that the use of performance measures for bridges (*i.e.*, Poor and Good) will



encourage the use of a “worst-first” approach to investment, and limit the flexibility of State DOTs to employ asset management strategies and approaches. The AMPO expressed a similar concern that “the proposed process encourages a “worst-first” approach rather than focusing on strategically important facilities.”

The FHWA acknowledges that indiscriminately attempting to improve condition could lead to a “worst-first” approach to investment, but believes that the framework provided by MAP–21 will support a more strategic investment strategy in most cases. 23 U.S.C. 150(a) directs the NHPP to provide a means of efficient investment of Federal transportation funds by focusing on national transportation goals. These goals emphasize the importance of national routes to the economy, safety, and other concerns in the entire Nation. In a recent FHWA report to Congress (National Bridge and Tunnel Inventories Report—February 2015), it was shown that for the 10-year period of 2005–2014, the percentage deck area of bridges on the NHS classified as structurally deficient improved from 8.5 percent to 6.0 percent.<sup>105</sup> Therefore, even in the worst case, maintaining bridge conditions on the NHS to achieve 90 percent in Fair or better condition would likely not require the level of investment that would drive a program to a “worst-first” approach. On the contrary, good maintenance and preservation, as currently practiced in many State DOTs, would keep the requirements for major investment on these routes at a minimum, most likely well below the allowable 10 percent classified as structurally deficient.

The Texas DOT commented that three classifications for assessing bridge condition were presented in the NPRM: (1) Percentage of NHS bridges classified as in Good condition; (2) percentage of NHS bridges classified as in Fair condition; and (3) percentage of NHS bridges classified as in Poor condition. They recommended “not defining the Fair condition criteria and not making the States generate and maintain a value that is not utilized in the performance measures.”

Although the classification of bridges in Fair condition and its calculation is retained in the final rule, State DOTs and MPOs are not required to establish or report on performance targets for this classification. The reason FHWA retains

the language is that system-wide monitoring of assets will be done for the three classifications, not just the two bridge performance measures. The Fair classification is a simple calculation from the other two; therefore, there is no requirement for reporting on this classification.

The Colorado DOT commented that the proposed measures are “lag” measures focused on the percentage of structurally deficient deck area on the NHS. Therefore, they do not forecast or predict when a bridge will become structurally deficient. The Colorado DOT suggested that predictive structurally deficient performance measures should be proposed instead. Examples of these performance measures are leaking expansion joints over substructure elements, unsealed decks, failed deck seals, debris collections that accelerate deterioration, and failed steel protection systems. The Colorado DOT also commented that the proposed performance measures do not directly address the risks of bridges that are scour critical or do not meet current design standards.

As discussed in sections 490.405 and 490.411, FHWA revised the definition and methodology for the classification of structurally deficient so that it equates to the performance measure of bridges classified as in Poor condition. Also previously discussed, other than condition, the 23 U.S.C. 150 required the establishment of performance measures for bridges on the NHS but did not provide for any other factors such as forecasting or predicting. The suggested predictive performance measures go beyond describing the existing, in-place physical condition of a bridge. Forecasting or predicting bridge conditions is a bridge management tool or process rather than a measurement of performance. (See the Asset Management Plan final rule (RIN 2125–AF57), as the minimum standards for developing management systems will include forecasting deterioration.)

As for the additional factors based on risk, such as scour critical and not meeting current design standards, these are not considered a measure of condition. Therefore, FHWA retains the metrics in section 490.407 to be used in calculating the bridge performance measures.

Discussion of Section 490.409  
Calculation of National Performance Management Measures for Assessing Bridge Condition

To implement 23 U.S.C. 150(c)(3)(A)(ii)(III), FHWA proposed calculation methods to carry out the bridge condition related requirements of

this part and make the significant progress determination in section 490.109. The FHWA revised section 490.409(b) to provide clarity as to which highway bridges are subject to this regulation.

The Metropolitan Transportation Commission expressed support for the proposed classification approach for determining the condition of a bridge, where the lowest rating received for any component of a bridge determines the overall condition.

Three State DOTs (New York, North Carolina, and North Dakota) suggested that an alternative method to the proposed minimum of condition rating method be used for national performance measures under the NHPP. They suggested the weighted average method, which consists of calculating an overall condition rating based on a weighted average of NBI Items 58, 59, and 60. Another method that was offered was to simply not include NBI Item 58 in the calculation of the classification. An additional recommendation was to define Fair as “a bridge that is not structurally deficient and also having at least one NBI score of 5.” The recommendation stated that “a Good bridge would be defined as a bridge that is not structurally deficient and also having a minimum NBI score of 6.”

As was noted in the NPRM, FHWA performed a study (Improving FHWA’s Ability to Assess Highway Infrastructure Health) that evaluated five different methods (four different weighted average methods and one minimum condition rating method) to assign bridge condition based on the classifications of Good, Fair, or Poor.<sup>106</sup> The study concluded that for the Interstate System: (1) Percentages of bridges classified as Good, Fair, or Poor were consistent for all methods with little variation; (2) minimum condition rating method resulted in the highest percentage of bridges in Poor condition; (3) percentages of bridges classified as Good, Fair, or Poor based on the four weighted average methods are not sensitive to the weights; and (4) bridge deck conditions alone are not typically the driving factor in the Good, Fair, or Poor calculations. The FHWA further assessed the different methods and observed that the magnitude in differences between condition ratings for individual NBI items was somewhat nullified when a final average or weighted average method was

<sup>105</sup> U.S. Department of Transportation, Federal Highway Administration. Report to Congress, National Bridge and Tunnel Inventories Report, Fall 2015, has been posted to the Docket.

<sup>106</sup> FHWA (2012). Improving FHWA’s Ability to Assess Highway Infrastructure Health Pilot Study Report, FHWA–HIF–12–049. <http://www.fhwa.dot.gov/asset/pubs/hif12049/hif12049.pdf>.

employed. This observation was also noted in the 2012 study.<sup>107</sup> The masking or obscuring of possible Poor bridge conditions is a major concern with the final average or weighted average methods. This concern also applies to the suggested method of a Fair bridge “having at least one NBI score of 5” and “a Good bridge . . . having a minimum NBI score of 6.” Although these methods could be further refined, the development, subjectivity, and complexity of such methods makes them less desirable than the simple minimum condition rating method. This is especially true because analyses indicate that a refined weighted method would result in the same general classification as the minimum condition rating method.

As for the suggested method to not include NBI Item 58 in the calculation of the classification, the deck is a critical component of a bridge as it provides the surface upon which vehicles travel. Omitting such a fundamental component of a bridge would not provide an accurate assessment of its overall condition or performance. Therefore, FHWA retains the language in section 490.409 for the calculations of the three bridge classifications and the two bridge performance measures. However, FHWA made a minor revision that provides clarity as to which highway bridges are subject to this regulation.

The South Jersey Transportation Planning Organization argued that the proposed minimum condition rating method was controlled by lowest rating of a bridge’s three NBI Items (58, 59, and 60) substructure, regardless of whether any of the proposed metrics were rated the same or not. They suggested that the method “may have a disadvantage in that some categories may be much more expensive to repair, and as such, give a distorted view of the over-all bridge repairs needed.”

As discussed above, in assessing various methods for determining the classification of a bridge, FHWA is concerned with the masking or obscuring of possible Poor bridge conditions when an average or weighted average method is used. Although these methods could be further refined, the development, subjectivity, and complexity of such methods makes them less desirable than the simple minimum condition rating method. As previously stated, analyses indicate that a refined weighted method would result in the same general classification as the minimum condition rating method. Regarding the possible distortion of

estimated costs and overall bridge repair needs, other than “condition,” the statute did not provide for any other factors such as costs or needs.

Four State DOTs (Delaware, Idaho, North Carolina, and North Dakota) disagreed with the proposed calculation methods for the bridge classifications of Good and Fair. Suggestions included making the calculation methods flexible to allow State DOTs to define the classifications and the method of calculations for themselves and to include the NBI condition rating of six in the Good classification. The NBI zero to nine scale for condition ratings for the classifications of Good, Fair, and Poor are based on the historical practice of generalization of the scale and the logical distinctions that are made between the descriptions for the various condition ratings. For example, according to FHWA’s Recording and Coding Guide for the Structure Inventory and Appraisal of the Nation’s Bridges, a condition rating of six is described as “satisfactory condition, structural elements show some minor deterioration.” While some commenters have suggested including this condition rating as Good, doing so would be an inaccurate assessment of the condition of the bridge as Good indicates that there are some minor problems, which is different than minor deterioration. Additionally, the comparative analysis study of bridge conditions conducted through NCHRP 20–24(37)E (Measuring Performance Among State DOTs, Sharing Best Practices—Comparative Analysis of Bridge Conditions), recommended defining: (1) Poor as bridges with deck, superstructure, or substructure ratings less than or equal to four; (2) Good as bridges with deck, superstructure or substructure ratings greater than or equal to seven; and (3) all other bridges as Fair condition.<sup>108</sup> Therefore, FHWA retains the language of the NPRM, with a minor revision that provides clarity as to which highway bridges are subject to this regulation, for the calculation of the classifications of Good, Fair, and Poor.

The Knoxville Regional Transportation Planning Organization suggested that “reconfiguring the NBI condition rating approach from its current zero to nine rating to a Good, Fair, or Poor rating would not be favorable.” They argued that it would be “complicated to convert the data to fit to the new scale.” They also suggested

that “if the Good, Fair, or Poor rating scale was still used, perhaps there could be a matrix created for the conversion that would further define the new condition rating scale.” The FHWA retains the language of the NPRM, with a minor revision that provides clarity as to which highway bridges are subject to this regulation, for the calculation of the three bridge classifications. In section 490.409, the calculation of the classifications are provided in detail, including specific information on how to convert the numerical NBI condition rating to a classification of Good, Fair, or Poor condition (*i.e.*, a conversion matrix is provided).

The Missouri DOT argued against the use of the bridge deck area that is reported with element level bridge data, stating that no deck area for culverts is reported with element level data.

The deck area calculation for culverts and culverts where the roadway is on a fill are in sections 490.409(c)(1) and 490.409(c)(2) (see formulas and explanations for the terms “length” and “width.”) In general, the deck area of a culvert is the product of NBI Items 49 (Structure Length) and 52 (Deck Width). For culvert where the roadway is on a fill, the deck area of a culvert is the product of NBI Items 49 and 32 (Approach Roadway Width).

The California and North Dakota DOTs suggested a change to the proposed calculation of deck area for culverts. The change involves replacing NBI Item 32 with the culvert element length in the calculation. The NBI does not include an item for culvert element length.

In order for such an item to be used for the calculation of deck area, an additional collection burden would be placed on State DOTs. Currently, the NBI includes Item 32, which provides an accurate measurement to calculate a deck area that is influenced by the roadway. By using the proposed alternative of culvert element length, deck area calculations may be exaggerated. For example, culverts where the roadway is on a significant amount of fill can be much longer than the width of roadway that is supported. This would result in a calculated deck area that is much larger than an area influenced only by the roadway. Therefore, FHWA retains the language of the NPRM, with a minor revision that provides clarity as which highway bridges are subject to this regulation, for calculating the deck area of bridges, including culverts.

The California DOT also stated, the proposed deck area calculation “assumes that every bridge is rectangular in shape. This assumption

<sup>108</sup> Transportation Research Board of the National Academies, National Cooperative Highway Research Program, NCHRP 20–24(37)E, Measuring Performance Among State DOTs, Sharing Best Practices, [http://onlinepubs.trb.org/onlinepubs/nchrp/docs/NCHRP20-24\(37\)E\\_FR.pdf](http://onlinepubs.trb.org/onlinepubs/nchrp/docs/NCHRP20-24(37)E_FR.pdf).

<sup>107</sup> Ibid.

ignores ramp area, curved configurations, and other irregular deck shapes. The MAP–21 requires the submission of bridge deck area in the elements that could be used to directly report bridge deck area including all irregular configurations. Use of the element deck areas would improve the accuracy of the measure.” The MAP–21 did not require State DOTs to report a bridge deck area element as part of 23 U.S.C. 144(d)(2).

The Colorado DOT asked whether the areas of approach slabs will be included in the calculation of a bridge’s deck area. The deck area of bridge will be calculated as described in section 490.409. The calculation does not include the areas of approach slabs.

The Iowa DOT suggested that a formula similar to FHWA’s former Sufficiency Rating be used instead to classify bridge condition. Formulas such as the Sufficiency Rating were tools to assist in the identification and prioritization of bridge projects and needs. They are not necessarily indicators of physical condition as they included other factors such as level of service and functional obsolescence. As discussed in section 490.407, the statutory language focused the bridge performance measures on the factor of condition, with the national performance goal of maintaining bridge condition in a state of good repair. It did not provide other factors to be considered for the bridge performance measures or the national performance goal. Therefore, FHWA retains the language in section 490.409 for the metrics to be used in calculating the bridge performance measures.

The Wyoming DOT recommended that the final rule significantly scale back or modify a number of its requirements, such as additional data collection. In regards to the bridge performance measures, there is no additional data collection burden as the data that is currently collected under 23 CFR 650.305 (National Bridge Inspection Standards) will be used to meet the data requirements for this subpart.

The AMPO expressed concern that the combination of bridge data submission requirements (e.g., NBI data and element level bridge data) “will effectively require States to collect duplicative data at considerable cost.” The comment went on to state that the rule should, “Require States to use either the NBI or the new methodology for all bridge related reporting requirements, but not both.” As was stated above, there is no additional data collection burden in regards to the bridge performance measures as the data

that is collected under the NBIS will be used. In regards to element-level data, 23 U.S.C. 144(d)(2) requires the collection of such for bridges on the NHS. This type of data is not duplicative of the NBI data as this data provides more detailed information.

The New York City DOT commented that there is no reference to biennial inspections as the primary source of bridge related information. The commenter further stated that “risk-based scheduling at varying intervals of up to 6 years is proposed at the discretion of the owner. Rather, one could keep the biennial inspection interval fixed, but vary the inspection scope. This would be highly appropriate in large structures with components of very different exposure to aggressive influences.” The NPRM did not propose any such change to the NBIS which define the intervals at which highway bridges are to be inspected. The NPRM did state that the NBI is the definitive source for national bridge information and that the NBI by definition is an FHWA database containing bridge information and inspection data for all highway bridges on public roads, on and off Federal-aid highways, including tribally owned and Federally owned bridges, that are subject to the NBIS.

The California DOT questioned if a scour critical bridge should be considered “Poor” under the provisions of this rule. The California DOT also requested clarification if FHWA’s policy directive related to the Highway Bridge Program of lowering the substructure condition rating (NBI 60) to match the scour code (NBI 113) for scour critical bridges is still in effect as MAP–21 eliminated the Highway Bridge Program. Under this rule, a highway bridge is classified as in Poor condition based on the criteria of section 490.409(b)(3). There is no FHWA policy related to the Highway Bridge Program, which directed the matching of the codes for NBI items 60—Substructure and 113 Scour Critical Bridges. However, the errata to FHWA’s Recording and Coding Guide for the Structure Inventory and Appraisal of the Nation’s Bridges, Report No. FHWA–PD–96–001, December 1995, does state, “The rating factor given to Item 60 should be consistent with the one given to Item 113 whenever a rating factor of 2 or below is determined for Item 113—Scour Critical Bridges.”

The Louisiana DOT requested that an example State be created and the principals of the bridge measures be applied to it, as it would better their understanding of how the practice will be used. The FHWA will issue guidance on step-by-step procedures that detail

the data and the calculations for the national performance measures for 23 U.S.C. 150, which includes the bridge performance measures.

The FHWA made an editorial change in section 490.409(b)(1) through (3) to remove the phrase “of any” to provide clarity in the regulatory text that Good, Fair, or Poor classification of a bridge is determined based on the lowest rating of three NBI items (58, 59, and 60) for that bridge. These paragraphs in the final rule now state: “. . . When the lowest rating of the three NBI items for a bridge (Items 58—Deck, 59—Superstructure, 60—Substructure) is . . .” This editorial change did not alter the intent of the original text in the NPRM.

#### Discussion of Section 490.411 Establishment of Minimum Level for Condition for Bridges

To implement the statutory provisions under the NHPP for the condition of NHS bridges, FHWA incorporated the minimum condition level established by 23 U.S.C. 119(f)(2). The FHWA revised the NPRM language in section 490.411(a) to provide clarity as to which highway bridges are subject to this regulation.

The AASHTO, with support from six State DOTs (Idaho, Montana, North Dakota, South Dakota, Oklahoma, and Wyoming), suggested changes to the proposed methodology for the classification of structurally deficient. Their suggestion was to lower the threshold of the classification for NBI Items 58, 59, 60, and 62 from a condition rating of four (Poor condition, advanced section loss, deterioration, spalling or scour) to three (serious condition, loss of section, deterioration, spalling, or scour have seriously affected primary structural components. Local failures are possible. Fatigue cracks in steel or shear cracks in concrete may be present). The AASHTO and Alabama DOT also suggested removing NBI Items 67 (Structural Evaluation) and 71 (Waterway Adequacy) from the factors in the determination process.

The New Hampshire DOT “strongly” disagreed with AASHTO’s recommendation of lowering the threshold. The New Hampshire DOT argued that the general public and elected officials currently have a good understanding of the classification of structurally deficient and changing the definition would cause confusion. Additionally, New Hampshire DOT expressed that such a change would result in having “many thousands fewer ‘Structurally Deficient’ bridges, which also implies that there are fewer bridges



that need to be replaced or substantially rehabilitated.” The Missouri DOT recommended not using element level data as it “is cumbersome and results in a large amount of data, which is not meaningful and is complicated to convert to a Good, Fair, or Poor condition rating.” The Georgia DOT requested clarification on whether the NHPP penalty provision is based on the classification of structurally deficient or the bridge performance measure of Poor.

The AASHTO comment also included a suggestion, which four State DOTs supported (Connecticut, Iowa, New Jersey, and New York), that FHWA should note in the final rule that the use of current NBI data for calculating bridge performance measures and classifying bridges on the NHS as structurally deficient is temporary and that there is a transition plan to use element level bridge data.

The New York City DOT similarly commented that the “proposed performance measures are obsolete on arrival” as “FHWA is adopting the AASHTO element level inspection with ratings 1–4.” The comment also stated that the “The AASHTO system, while element—level is not span—specific. Thus, even if updated to element level inspections, NBI will not reflect the complexity of the multi-span bridges.”

As previously discussed, FHWA revised the definition and methodology for the classification of structurally deficient so that it is the same calculation used for classifying bridges as in Poor condition. Although element level bridge data is now being reported to the NBI, the analysis and development as to how this data could be used to calculate the proposed bridge performance measures and classify bridges on the NHS as structurally deficient needs to be conducted and completed. Once completed, element level bridge data, and any other pertinent bridge information or metric that provides an improved indicator for bridge condition, may be considered in revising this regulation in the future. Additionally, it is anticipated that element level data for all of the bridges on the NHS will not be in the NBI until 2019 due to the nature of inspection intervals, which can be up to 48 months. Therefore, the current NBI, with its extensive historical data sets and availability, is the most appropriate metric for assessing the condition of bridges on the NHS and classifying them as Structurally Deficient.

Four State DOTs (Alabama, Maryland, Minnesota, and Missouri) supported the use of the current NBI Items instead of element level bridge data.

The Colorado DOT asked whether the area of approach slabs will be included in the calculation of a bridge’s deck area. The deck area of bridge will be calculated as described in section 490.411. The calculation does not include the area of approach slabs.

The Georgia DOT commented that the March 15 submission date for the most current NBI data on highway bridges to FHWA would result in changes to business practices and require additional resources. The Virginia DOT recommended that the NBI data submittal date remain as April 1 of each year as currently established as it allows for all State bridges inspected in the previous year to be entered in the data base within (and is consistent with) the 90-day period established by 23 CFR 650.315(b) and (c) for Structure Inventory and Appraisal data on State bridges. The FHWA retains the March 15 submission date. Reporting by March 15 is needed in order to administer the NHS bridge minimum condition provision and issue any penalties by the next fiscal year.

#### Discussion of Section 490.413 Penalties for Not Maintaining Bridge Condition

To implement the penalty for not maintaining the condition of NHS bridges under the NHPP, FHWA incorporated the minimum condition level for bridges on the NHS established by 23 U.S.C. 119(f)(2). The penalty is as follows: If FHWA determines for the 3-year period preceding the date of the determination, that more than 10.0 percent of the total deck area of bridges in the State on the NHS is located on bridges that have been classified as Structurally Deficient, then during the fiscal year following the determination, the State DOT shall obligate and set aside in an amount equal to 50 percent of funds apportioned to such State for fiscal year 2009 to carry out 23 U.S.C. 144 (as in effect the day before enactment of MAP–21) from amounts apportioned to a State for a fiscal year under 23 U.S.C. 104(b)(1) only for eligible projects on bridges on the NHS. The set-aside and obligation requirement shall remain in effect for each subsequent fiscal year until such time as less than 10 percent of the total deck area of bridges in the State on the NHS is located on bridges that have been classified as Structurally Deficient as determined by FHWA.

The ASCE, a private citizen (Nicholas Cazares), and Missouri DOT expressed support for this section.

The FHWA received various comments regarding the statutory provisions under the NHPP for the

penalty of not maintaining the condition of NHS bridges. The NYSAMPO and the State DOTs of Rhode Island and Texas argued that the implementation of a penalty to maintain a minimum condition is inconsistent with the principles of asset management. They argued that the penalty would promote a “worst-first” philosophy, delay the achievement of a state of good repair, and distort a State DOT’s ability to properly invest. Additionally, the New York DOT suggested eliminating the penalty. The Connecticut DOT argued that the 10 percent threshold and 50 percent formula amount for the structurally deficient classification and the set-aside are arbitrary. They commented that the penalty provisions appear “to have no basis in engineering principles or generally accepted asset management practices.” Similarly, ASCE endorsed a goal of 8 percent instead of 10 percent. The Oregon and Texas DOTs suggested an alternative to the set-aside penalty. They suggested that a State DOT submit to FHWA an investment plan to reduce the percentage of deck area of bridges on the NHS classified as structurally deficient. The SCAG suggested that the penalty provisions should not be implemented without the apportionment of additional funds to locals because the penalty imposed on a State DOT would in turn reduce the availability of Federal funds for locals.

The FHWA essentially incorporated the minimum condition level for bridges on the NHS into the final rule consistent with 23 U.S.C. 119(f)(2). The MAP–21 did not provide FHWA the authority to eliminate the penalty provisions or change the threshold for structurally deficient or the set-aside amount.

Three State DOTs (Colorado, Connecticut, and New York) and AASHTO argued that October 1, 2016, the initial date of determination of compliance with the minimum condition requirements specified in 23 U.S.C. 119(f)(2), is “too soon” and “State DOTs will have no time to assess their current situation and then implement reasonable projects to attempt to affect their meeting the 10 percent threshold.”

The MAP–21 and 23 U.S.C. 119(f)(2) have been in effect since July 6, 2012. The FHWA provided guidance ahead of the NPRM on the provisions of 23 U.S.C. 119(f)(2) and its implementation on September 25, 2012. In implementing the 23 U.S.C. 119(f)(2) provisions, the NPRM proposed a definition and computation for the classification of structurally deficient that was unchanged from the programmatic term that was used for

over 30 years to administer the Highway Bridge Program. Bridge owners have been aware and knowledgeable of this well-established classification of structurally deficient, which was one of three statuses used to determine eligibility and apportion funds to State DOTs from the Highway Bridge Program. The initial date of determination proposed in the NPRM provides more than 3 years for owners of NHS bridges to assess the condition of their bridges and implement projects in response to a possible penalty. This was based on data Federal agencies, State DOTs, and tribal governments were already collecting and submitting to FHWA for inclusion into the NBI and for a classification that has been well-known for decades.

However, FHWA revised NPRM implementing the statutory provisions of 23 U.S.C. 119(f)(2) in response to the comments. The revisions were also made due to the revisions to the definition and computation of the classification of structurally deficient and the new methods of calculation for the deck area of culverts and border bridges. In sections 490.405, 490.411(b), and 490.411(c), FHWA provides a transition period for implementing the statutory provisions under the NHPP for the penalty of not maintaining the condition of NHS bridges. This transition period provides State DOTs and MPOs additional time to adjust to the revised definition and computation for the classification of structurally deficient and the new calculations for deck area of culverts and border bridges. Initially, the statutory provisions will be implemented using the historical definition and method of determination for the classification of structurally deficient as used under the Highway Bridge Program, as proposed in the NPRM. Beginning in calendar year 2018 (*i.e.*, the NBI submittal for March 15, 2018), the statutory provisions will be implemented with the revised definition and computation for the classification of structurally deficient and the new methods of calculations for the deck area of culverts and border bridges.

The Mississippi and North Dakota DOTs argued that States should not be responsible for assets that are beyond their control and therefore not incur any penalties that may be due to those assets' conditions.

As discussed previously, FHWA recognizes that there is a limit to the direct impact State DOTs and the MPOs can have on performance outcomes within State and the metropolitan planning area, respectively. However, there is no such limit on the use of NHPP funds for any highway bridge that

is on the NHS. Recipients of NHPP apportionments (*i.e.*, State DOTs) can provide other owners of bridges on the NHS with NHPP funds (and Surface Transportation Block Grant Program funds) to improve the condition of bridges. Therefore, FHWA encourages State DOTs to consult and coordinate with relevant entities (*e.g.*, Federal land Management agencies, MPOs, local transportation agencies, and tribal governments) as they report performance data and establish targets. This will allow the State DOTs to better assess condition of bridges on the NHS and better identify and consider factors outside of their direct control that could impact future condition/performance. (See the previous discussion of responsibility for the reporting of data, establishment of targets, asset condition, and managing of assets that are beyond the control of State DOTs and MPOs and the discussion of ownership in the discussion section for section 490.105(d).)

The FHWA retains the language in section 490.413 as the statutory language in 23 U.S.C. 119 clearly identifies State DOT's apportionment under 23 U.S.C. 104(b)(1) when implementing the penalty. Because the statutory language does not provide that the terms "National Highway System" or "States," as used in this provision, mean anything different than the terms as defined in 23 U.S.C. 101(a)(15) and 23 U.S.C. 101(a)(25). The Missouri DOT requested clarification on the 3-year-period preceding the date of the determination. The determination of compliance with the minimum condition requirements specified in 23 U.S.C. 119(f)(2) would be carried out by FHWA for fiscal year 2017 and annually thereafter. The timing is based on an assessment of minimum condition compliance of NBI data submitted in 2014, 2015, and 2016. If for each of those years the percentage deck area of bridges on the NHS classified as structurally deficient is greater than 10.0 (*e.g.*, 12.5, 11.3, and 10.5), then the penalty would be assessed for fiscal year 2017 and annually thereafter until the percentage is less than 10.0.

## VII. Rulemaking Analyses and Notices

The FHWA considered all comments received before the close of business on the extended comment closing date indicated above. The comments are available for examination in the docket (FHWA–2013–0053) at [www.regulations.gov](http://www.regulations.gov). The FHWA also considered comments received after the comment closing date to the extent practicable.

## Responses to Public Comments on the NPRM's Regulatory Impact Analysis

The FHWA carefully considered the comments related to: (1) Underestimated costs; (2) alternate cost estimates; (3) the cost for processing additional cracking data and maintaining a data quality management program; (4) the cost of IRI-only data collection on the non-Interstate NHS; (5) the cost of historical pavement condition performance management practices; (6) estimating the cost of establishing performance targets with incomplete knowledge about the availability of tools; (7) understated benefits; (8) the need for a quantitative analysis; (9) unfunded mandates; (10) Americans with Disabilities Act (ADA) issues; and (11) right-of-way (ROW) issues. The FHWA's responses to these comments are discussed below.

Agile Assets Corporation, NYMTC, TEMPO, Transportation for America, and the State DOTs of Michigan, Mississippi, North Carolina, and Oregon commented that FHWA may have underestimated the costs of the proposed rule.

The FHWA reviewed the process used to estimate costs. To develop estimates of the costs of the proposed rule, FHWA interviewed Federal, State, and local practitioners and SMEs. The FHWA researched existing literature on bridge and pavement condition, and reviewed Federal and State agency Web sites for information on current bridge and pavement condition data collection and reporting practices. In the final rule, FHWA retains the NPRM's methodology and assumptions, which are listed in Section 3 and described in detail in Section 4 of the final rule's RIA. The original and updated RIA can be found in the docket for this rulemaking. The estimated level of effort and costs to comply with the rule represent nationwide estimates of current practices as derived from interviews with Federal, State, and local practitioners. Therefore, these estimates represent average costs for a State DOT. The FHWA understands that the actual costs incurred may be higher for some State DOTs and MPOs, and lower for others.

The Michigan and Oregon DOTs provided alternative estimates for the costs they argue were underestimated in the NPRM. Oregon DOT commented that one additional full-time employee would be needed for pavement data collection as a result of the rule, at an incremental cost of \$150,000 per year. Michigan DOT argued that data collection costs would increase by \$100,000 per year. Michigan DOT also



asserted that processing additional cracking data and maintaining a data quality management program would potentially double current costs but did not provide an estimate.

The FHWA compared its estimated costs from the NPRM to the estimates provided by the commenters. The FHWA estimated that the cost to collect data on the Interstate and non-Interstate would be approximately \$97,000 per State DOT per year (see Sections 4.2.1 and 4.2.3 of the final RIA). After additional consultation with SMEs, FHWA revised the final rule's RIA to a cost of \$150,000 per State DOT per year for data collection as recommended by commenters and SMEs.

In response to Michigan DOT's comments on the costs for processing additional cracking data and maintaining a data quality management program, FHWA reviewed the process used to estimate the cost. In the NPRM, FHWA estimated that a State DOT would incur costs of approximately \$37,000 per year for a new cracking data collection program (see Sections 4.2.2 and 4.2.4 of the RIA). In addition, FHWA estimated new quality management programs would cost a State DOT approximately \$62,000 per year, while upgrading an existing program would cost approximately \$31,000 per year (see Section 4.2.7 of the RIA). In the final rule RIA, FHWA maintains these assumptions.

Mississippi DOT commented that the NPRM RIA incorrectly assumed that the costs of IRI-only data collection on the non-Interstate NHS would be offset by efficiencies in other areas. The FHWA reexamined and confirmed the estimated costs of IRI-only data collection on the non-Interstate NHS as presented in Section 4.2.3 of the RIA. Therefore, FHWA did not revise this portion of the RIA for the final rule.

AgileAssets Corporation commented that agencies would continue to use their historical pavement condition performance management practices in addition to new requirements in the NPRM. They also argued that State DOTs would incur additional costs associated with historical pavement condition performance management practices. The FHWA reviewed the analytical approach used in the RIA. The FHWA prepared the NPRM's RIA in accordance with the guidance provided in OMB Circular A-4, "Regulatory Analysis." As such, the analysis accounts for the incremental costs of the rule; that is, those costs incurred above and beyond the costs in the absence of the rule. As discussed in Section 4.1.2 of the NPRM's RIA, FHWA estimated that State DOTs would incur \$53

million for reporting on the new performance measures. Therefore, the RIA costs are maintained for this final rule.

Michigan DOT commented that estimating the cost to establish performance targets with incomplete knowledge about the availability of analytical tools to determine achievable levels of performance would be costly to develop if State DOTs did not already have them.

The FHWA notes that the requirements of this performance measure rule do not explicitly require tools to analyze alternative investment strategies and decisionmaking.<sup>109</sup> Therefore FHWA did not account for them.

A private citizen (Nicholas Cazares) commented that benefits were understated in the NPRM's RIA, as it does not account for the benefits to local economies that will be derived from improvements in transportation. Specifically, Mr. Cazares cited faster commutes due to widened roads or the construction of new bridges (*e.g.*, reduced travel delays and CO<sub>2</sub> emissions). "The California DOT noted the benefits of pavement preservation efforts. The commenter remarked that preservation efforts extend the life of assets in Good and Fair condition and would reduce the number of pavements in the Poor condition category."

The FHWA disagrees that the benefits were understated in the NPRM's RIA. The benefits were estimated based on a break-even analysis. The non-quantifiable benefits derived from the implementation of the rule could include improved pavement and bridge conditions, which would result in improved traffic flow. In the benefits analysis for the NPRM, FHWA also acknowledged that there may be many non-quantitative benefits derived from the implementation of the rule, such as time savings that would result from trucks no longer having to be rerouted from bridges with severe weight restrictions (see Section 5 of the RIA) and reduced traffic and emissions in the RIA for the third performance measure rulemaking (docket number FHWA-2013-0054).

The FHWA reviewed the approach taken in the NPRM's RIA. In the NPRM, FHWA prepared break-even analyses to quantify the benefits of the rulemaking. The break-even analyses provided estimates of the thresholds that must be reached in order for the rule to be cost-

<sup>109</sup> For more discussion on planned activities, please see the section "Suggestions for how FHWA can best assist States and MPOs to maximize opportunities for successful implementation of the proposed performance measures."

beneficial, an approach endorsed by OMB Circular A-4. The FHWA determined that this approach, rather than a quantifiable approach, is appropriate for evaluating the costs of the rule. For more information on the break-even analyses, agencies should refer to the benefits discussion later in this section, or Section 5 of the RIA document on this docket.

The Mississippi DOT and an anonymous commenter questioned the unfunded mandates aspect of the rulemaking. Specifically, Mississippi DOT disagreed with FHWA's determination that the rule was not an unfunded mandate.

In the final rule, FHWA did not change its determination that the rule is not an unfunded mandate. According to the Unfunded Mandates Reform Act of 1995 (UMRA) (Pub. L. 104-4, 109 Stat. 48), a rule would contain an unfunded mandate if any of its requirements result in expenditures of \$151 million or more in any 1 year for either State, local, or tribal governments, in the aggregate, or by the private sector (See the discussion on UMRA in Section VII, Rulemaking Analyses and Notices, of this document). The costs in the NPRM did not meet this threshold.

An anonymous citizen argued that repaving and certain pavement maintenance activities would require bringing facilities in conformance with the ADA. The commenter argued that since the ADA, ROW, and facility upgrade costs were omitted from the cost analysis, the costs of the rule were underestimated. The commenter also warned that upgrades to bring the pavements into conformance with ADA, and the related costs, may result in the taking of private property under Executive Order (E.O.) 12630 and may violate UMRA.

The FHWA notes that the NPRM required agencies to report on the condition of pavement. The methods used for pavement maintenance are not expected to change as a result of the rule. Therefore, costs related to ADA or ROW issues, such as those called for in 23 CFR 625.4 and 49 CFR 37.9, are outside the scope of the rule, and would not have taking implications under E.O. 12630 or violate UMRA. Furthermore, current practices regarding upgrading facilities are routinely subject to efficiency determinations that qualify for exemptions on a case-by-case basis, as described in 23 CFR 625.3. The current requirements for upgrading facilities or exception practices are not impacted by the implementation of this rule.

Executive Order 12866 (Regulatory Planning and Review), Executive Order



13563 (Improving Regulation and Regulatory Review), and Departments of Transportation Regulatory Policies and Procedures.

The FHWA determined that this final rule constitutes an economically significant regulatory action within the meaning of E.O. 12866 and DOT regulatory policies and procedures. This action complies with E.O.s 12866 and 13563. This action is considered “economically significant” because this rulemaking will result in the transformation of the Federal-aid highway program so that the program focuses on national goals, provides for a greater level of accountability and transparency, and provides a means for the most efficient investment of Federal transportation funds. The FHWA completed an RIA in support of the final rule. The RIA estimated the economic impact, in terms of costs and benefits, on Federal, State, and local governments and private entities regulated under this action, as required by E.O.s 12866 and 13563. However, the RIA did not attempt to directly quantify the changes from the improved decisionmaking. The economic impacts are measured on an incremental basis, relative to current pavement and bridge condition reporting practices.

The RIA identified the estimated costs and benefits resulting from the final rule in order to inform policymakers and the public of its relative value. The complete RIA may be accessed from the

docket (docket number FHWA–2013–0053).

The cornerstone of MAP–21’s highway program transformation is the transition to a performance-based program. The MAP–21 requires State DOTs to invest resources in projects to meet or make significant progress toward meeting performance targets that will make progress toward national goals. The national performance goal area established for infrastructure condition is to maintain the highway infrastructure asset system in a state of good repair. In order to carry out this mandate, MAP–21 requires FHWA to promulgate a rule to establish pavement and bridge condition performance measures and standards. As required by MAP–21, the final rule identifies the following pavement and bridge performance measures for which State DOTs and MPOs must collect and report data, establish targets for performance, and make progress toward achievement of targets:

1. Percentage of lane miles of the Interstate System in Good condition;
2. Percentage of lane miles of the Interstate System in Poor condition;
3. Percentage of lane miles of the non-Interstate NHS in Good condition;
4. Percentage of lane-miles of the non-Interstate NHS in Poor condition;
5. Percentage of NHS bridges classified as in Good condition; and
6. Percentage of NHS bridges classified as in Poor condition.

#### *Estimated Cost of the Final Rule*

To estimate costs, FHWA assessed the level of effort, expressed in labor hours and categories, and the capital needed to comply with each component of the final rule. Level of effort by labor category is monetized with loaded wage rates to estimate total costs.

Table 4 displays the total cost of the final rule for the 10-year study period (2016–2025). Total costs are estimated to be \$156.0 million undiscounted, \$120.1 million discounted at 7 percent, and \$138.5 million discounted at 3 percent. The costs in the table assume that approximately half of the estimated 409 MPOs will establish their own targets, and the rest would adopt State DOT targets. It is assumed that State DOTs and MPOs serving Transportation Management Areas (TMA)<sup>110</sup> will use staff to establish performance targets. Conversely, it is assumed that MPOs not serving a TMA will agree to plan and program projects so that they contribute toward the accomplishment of the relevant State DOT targets. Therefore, they will not incur any incremental costs. There are currently an estimated 201 MPOs serving TMAs.<sup>111</sup> The FHWA made this assumption because larger MPOs may have more resources available to develop performance targets. The FHWA believes that this is a conservative estimate, as larger MPOs may elect not to establish their own targets for a variety of reasons, including resource availability.

TABLE 4—TOTAL COST OF THE FINAL RULE

Cost components	10-yr total cost		
	Undiscounted	7%	3%
Section 490.105–109—General Information, Target Establishment, Reporting on Progress, and Making Significant Progress .....	\$74,095,514	\$51,535,918	\$63,073,229
Coordination between State DOTs and MPOs .....	867,367	867,367	867,367
Establish and Update Performance Targets .....	31,750,717	22,897,706	27,448,308
Assess Significant Progress Toward Achieving Performance Targets .....	40,693,075	27,281,269	34,119,523
Reporting on Performance Targets Progress .....	784,356	489,576	638,032
Section 490.309—Data Requirements—Interstate IRI, Rutting, and Faulting .....	5,108,641	3,839,263	4,488,508
Tracking costs: Establish measurement for rutting .....	523,963	393,771	460,360
Tracking costs: Establish measurement for faulting .....	1,047,926	787,541	920,720
Data processing costs: Additional rutting data .....	1,964,862	1,476,639	1,726,349
Data processing costs: Additional faulting data .....	1,571,890	1,181,312	1,381,079
Section 490.309—Data Requirements—Interstate Cracking .....	16,259,029	12,671,493	14,506,400
Fully Automated State DOTs: Additional Data Quality Control Costs .....	1,309,908	984,426	1,150,899
Semi-Automated State DOTs: Additional Data Processing & Quality Control Costs .....	4,286,328	3,221,275	3,766,014
Manual & State DOTs not currently collecting: Training costs to adopt automated methods ....	1,820,915	1,820,915	1,820,915
Manual & State DOTs not currently collecting: Data quality control costs .....	8,841,879	6,644,877	7,768,571
Section 490.309—Data Requirements—Non-Interstate NHS IRI, Rutting, and Faulting .....	6,203,492	4,473,781	5,362,882
Data Collection costs: Increase IRI Measurement to Cover 100 percent of non-Interstate NHS miles .....	618,044	445,716	534,296
Data processing costs: Additional rutting and faulting data collected .....	681,152	491,227	588,852

<sup>110</sup> A TMA is an urbanized area having a population of over 200,000 or otherwise requested by the Governor and the MPO and officially designated by FHWA or FTA. 23 U.S.C. 134(k).

<sup>111</sup> The FHWA updated the estimated total number of MPOs to 409, which is less than the 420

MPOs used at the time that the NPRM was published. The estimated number of MPOs serving TMAs is now 201, less than the estimate of 210 in the NPRM. At the time the RIA was prepared for the NPRM, FHWA assumed that the 36 new urbanized areas resulting from the 2010 Census

would have MPOs designated for them. In reality, some of the newly designated urbanized areas merged with existing MPOs, resulting in the designation of fewer new MPOs than expected.

TABLE 4—TOTAL COST OF THE FINAL RULE—Continued

Cost components	10-yr total cost		
	Undiscounted	7%	3%
Tracking costs: Establish measurement for rutting .....	2,724,609	1,964,910	2,355,408
Tracking costs: Establish measurement for faulting .....	2,179,687	1,571,928	1,884,327
Section 490.309—Data Requirements—Non-Interstate NHS Cracking .....	4,322,696	3,117,405	3,736,946
Additional data quality control costs for new data collection .....	4,322,696	3,117,405	3,736,946
Section 490.309—Data Requirements—Capital Costs .....	16,600,000	15,891,841	16,254,041
Profiler .....	9,100,000	8,391,841	8,754,041
Faulting Software .....	1,000,000	1,000,000	1,000,000
Cracking Video Equipment and Software Purchase .....	6,500,000	6,500,000	6,500,000
Section 490.313—Calculation of performance management measures .....	8,482,450	7,994,228	8,243,938
Reprogramming of software to allow Performance Calculations .....	6,517,588	6,517,588	6,517,588
FHWA's Management of Data Submissions .....	261,982	196,885	230,180
Filtering out Bridge Pavement from Pavement Data .....	1,702,880	1,279,754	1,496,169
Section 490.319—Other Requirements .....	17,074,492	12,843,230	15,007,381
Develop a Quality Management Program .....	45,688	45,688	45,688
Run New Quality Management Program .....	3,274,770	2,461,066	2,877,249
Improve Quality Management Program .....	13,754,034	10,336,476	12,084,444
Section 490.407—Calculation of bridge performance measures .....	6,883,091	6,792,272	6,838,723
Update Software to generate Good/Fair/Poor condition .....	6,517,588	6,517,588	6,517,588
FHWA's Management of Data Submissions .....	365,503	274,684	321,135
<b>Total Cost of Final Rule .....</b>	<b>155,979,715</b>	<b>120,109,737</b>	<b>138,462,355</b>

The final rule's 10-year undiscounted cost (\$156.0 million in 2014 dollars) decreased relative to the proposed rule (\$196.4 million in 2012 dollars). As discussed below, FHWA made a number of changes that affected cost.

#### General Updates

In the final rule RIA, FHWA updated all costs to 2014 dollars from the 2012 dollars used in the proposed rule RIA. In addition, FHWA updated labor costs to reflect current BLS data. These general updates increased the estimated cost of the final rule relative to the proposed rule.

The FHWA deferred the effective date from 2015 to 2016. All costs that related to activities that were scheduled to begin in 2015 will now begin in 2016. Furthermore, the start dates for the performance period, reporting cycles, and phase-in requirements will be delayed by 2 years, with the first performance period beginning in 2018 rather than 2016. The data requirements for non-Interstate NHS IRI, rutting, faulting, and cracking will be deferred 1 year to 2019. The deferment decreased the number of years State DOTs and MPOs will incur costs within the 10-year analysis period. Therefore, the estimated costs that State DOTs and MPOs will incur to comply with the requirements of this final rule have decreased relative to the proposed rule.

The FHWA also updated the estimated total number of MPOs to 409, which is less than the 420 MPOs used at the time that the NPRM was published. The estimated number of MPOs serving TMAs is now 201, less

than the estimate of 210 in the NPRM. The number of non-TMA MPOs is 208, less than the estimate of 210 in the NPRM. At the time the RIA was prepared for the NPRM, FHWA assumed that the 36 new urbanized areas resulting from the 2010 Census would have MPOs designated for them. However, some of these newly designated urbanized areas merged with existing MPOs, resulting in the designation of fewer new MPOs than expected. The FHWA estimates that, on average, only the 201 larger MPOs serving TMAs will establish their own quantifiable performance targets. The FHWA also estimates that the 208 smaller MPOs serving non-TMAs will choose to agree to plan and program projects so that they contribute toward the accomplishment of State DOT pavement and bridge condition-related performance targets. Therefore, only the 201 larger MPOs serving TMAs will incur costs to reprogram and upgrade their software to be able to perform calculations of the performance measures. The reduction in the number of MPOs decreased the estimated costs to comply with the requirements of the final rule relative to the proposed rule.

#### Comments on Costs and Benefits in the Regulatory Impact Analysis

A number of State DOTs and MPOs took issue with the assumptions and levels of cost analysis associated with the requirements of the NPRM reflected in the benefit-cost analysis.<sup>112</sup> In terms

of benefits, Fugro Roadware, a firm that manufactures and operates equipment that is used to measure the pavement conditions on State and municipal networks, asserted that the "entire pavement and traffic assessment management process has been shown to improve the quality of road networks without an overall increase of funding . . ."

#### Need for Quantitative Analysis

The Colorado DOT argued that FHWA did not adequately justify its statement that benefits would outweigh the costs. They urged FHWA to conduct a quantitative analysis to support its claim.

This rulemaking constitutes a change to Federal regulations and was therefore subjected to an economic analyses according to E.O. 12866, (Regulatory Planning and Review) (58 FR 51735), as supplemented by E.O. 13563 (Improving Regulation and Regulatory Review) (76 FR 3821). These E.O.s direct each Federal agency to propose or adopt a regulation only upon a reasoned determination that the benefits of the intended regulation justify its costs. The FHWA completed and included an RIA in support of this final rule on the establishment of national performance management measures for pavement and bridge conditions. The RIA summary estimates the economic impact, in terms of costs and benefits, on Federal, State, and local governments and private entities regulated under this

<sup>112</sup> TEMPO, Atlanta Regional Commission, Transportation for America, and State DOTs of

Colorado, North Carolina, Mississippi, Oklahoma, Michigan, Georgia, Louisiana, and Oregon.

action, as required by E.O.s 12866 and 13563. The economic impacts are measured on an incremental basis, relative to current highway infrastructure condition performance reporting practices. To estimate costs for the rule, FHWA assessed the level of effort, expressed in labor hours and categories, and the capital investments needed to comply with each component of the rule. Level of effort by labor category is monetized with loaded wage rates to estimate total costs. These estimates were developed with input from State and MPO interviews. This document presents the summary of the analysis. The complete quantitative analysis can be found in the docket.

#### Section 490.105 Through 109 General Information, Target Establishment, Reporting on Progress, and Making Significant Progress

The RIA estimates the cost of coordination between State DOTs and MPOs, establishing and updating performance targets, reporting on performance targets progress, and assessing significant progress toward achieving performance targets under sections 490.105 through 490.109. The cost of these sections decreased from \$93.3 million for the proposed rule to \$74.1 million for the final rule. In addition to the general updates described above, the decrease in cost is partially offset by the additional costs of coordinating the establishment of targets in accordance with 23 CFR part 450.

#### Section 490.309 Data Requirements: Interstate IRI, Rutting, and Faulting

The RIA estimates the cost of data requirements for Interstate IRI, rutting, and faulting under section 490.309. The cost of this section decreased from \$30.7 million for the proposed rule to \$5.1 million for the final rule. In addition to

the general updates described above, the decrease in costs is attributable to FHWA's response to public comments on the burden associated with pavement data collection requirements. In response to public comment, FHWA relaxed the proposed requirement that would have required State DOTs to collect IRI data both directions. The final rule requires IRI data collection in at least one direction, which results in lower data collection costs.

#### Break-Even Analysis

Currently, State DOTs differ in the way they measure the condition of their pavement. The FHWA does not believe their current methods are inadequate, but they are inconsistent. The differences hinder accurate analysis of infrastructure conditions at the national level. The final rule establishes uniform condition measures for the purpose of carrying out the NHPP to assess condition of pavements on the NHS (excluding the Interstate System), pavements on the Interstate System, and bridges carrying the NHS, which includes on- and off-ramps, connected to the NHS. In addition, the final rule establishes processes that: (1) State DOTs and MPOs use to report measures and establish performance targets and (2) FHWA uses to assess progress that State DOTs have made toward achieving targets.

The FHWA expects that the final rule will result in certain benefits. The final rule will yield greater accountability because the MAP-21-mandated reporting will increase visibility and transparency. In addition, the rule will help focus the Federal-aid highway program on achieving balanced performance outcomes.

These benefits resulting from the rule (*i.e.*, greater accountability and greater

focus on making progress toward the national goal for infrastructure condition) will lead to improved pavement and bridge conditions. The benefits resulting from performance measurement, while real and substantial, are difficult to quantify. Therefore, FHWA quantified these benefits of the rule by performing break-even analyses, as described in OMB Circular A-4. A break-even analysis calculates the threshold a specific variable must achieve in order for benefits to equal costs, holding every other variable in the analysis constant. For pavements and bridges, FHWA focused its break-even analyses on VOC savings because users typically garner the greatest concentration of benefits from transportation projects. The FHWA estimated the number of road miles of deficient pavement that will have to be improved and the number of posted bridges that will have to be avoided in order for the benefits of the rule to justify the costs.

Table 5 presents the results from the pavement break-even analysis. The results represent the savings in VOC to automobile and truck drivers from pavement conditions that are improved from Poor to Good. The analysis shows that the rule will need to result in the net improvement of approximately 71 miles of pavement (*i.e.*, to Good condition) per year, or 710 miles over 10 years, that will otherwise not have been improved without the rule.<sup>113</sup> The annual break-even point represents approximately 0.3 percent of the NHS miles currently estimated to be in Poor condition. Based on recent trends in improving road condition, FHWA believes 71 miles of pavement per year or 710 miles over 10 years as a result of this rule is achievable.

TABLE 5—BREAK-EVEN IMPROVEMENT OF PAVEMENT CONDITIONS  
 [Improved from poor]

Annual improved VMT from poor needed	Annual poor VMT (total VMT * 11.8%)	Percent of poor VMT needing improvement	Current NHS miles estimated to be in poor condition	Approximate number of annual poor NHS miles needing improvement from poor
a	b	c = a ÷ b	d	e = c * d
562,187,982	193,346,999,390	0.29%	24,386	71

\* Please refer to the Summary Report for details on the methodology used in the analysis.

<sup>113</sup> The estimated annual break-even point accounts for the benefit in the year the improvement is made. Although the benefit from improved pavement will extend over multiple

years, the benefit declines year-to-year as the condition of the pavement declines. So, for the purposes of the analysis, we assume that 71 miles of poor pavement will need to be improved per year

in order for the rule to break even (rather than 71 miles total over the 10-year period).



Table 6 presents the results from the bridge break-even analysis, which calculates the number of year-long bridge postings that will need to be reduced as a result of the rule in order for the benefits of the bridge condition requirements to justify the costs. The FHWA estimated the average cost per year of a bridge posting in column E. With the undiscounted cost of the bridge requirements and this average cost of a bridge posting, the analysis estimates the number of year-long

bridge postings that need to be avoided in order to make the benefits of the rule justify the cost. The break-even analysis estimates that three separate 1-year long bridge postings need to be avoided over 10 years in order for benefits to justify costs.

As a basis for comparison, NBI data indicate that there were approximately 85 year-long NHS bridge postings for trucks in 2012. Over the 10-year period of 2003–2012, the number of NHS bridges posted for trucks declined from

145 to 85. Trends in the United States, demonstrated by bridge owners, provide evidence that posted bridges receive priority consideration in work schedules. With the increased performance requirements of the final rule, it is reasonable to assume that, at a minimum, a reduction in the posted load limit of one bridge annually nationwide would be achieved to provide the needed benefit to justify the costs of complying with this rule.

TABLE 6—BREAK-EVEN BRIDGE DETOURS

Undiscounted 10-year cost of bridge rule	Average truck user cost per VMT	Average distance per detour (miles)	Average cost of detour per trucks	Average cost per year of each bridge posting	Equivalent number of year-long posts that need to be avoided	Annual number of year-long posts that need to be avoided
a	b	c	d = b × c	e = d * 2,301 ADT * 365.25	f = a ÷ e	g = f ÷ 10 years
\$43,930,849	\$1.90	11	\$19.86	\$16,692,683	3	0.3

\* Please refer to the Summary Report for details on the methodology used in the analysis.

Relative to the proposed rule, the threshold for the pavement break-even analysis decreased in the final rule. Specifically, the number of NHS miles in Poor condition needing improvement to Fair condition decreased from 435 to 71 in the final rule. The break-even point decreased due to an adjustment to the incremental maintenance and repair cost per VMT, a decrease in the undiscounted 10-year cost of the pavement rule, and an increase in the total VMT that are in Poor condition.

The threshold for the bridge break-even analysis increased in the final rule relative to the proposed rule. Specifically, the number of 1-year long bridge postings that need to be reduced increased from 2 to 3 in the final rule. The break-even point increased due to the following updates to input data:

- The average detour for bridges posted with weight limits of at least 40 percent below the legal load decreased from 20 miles to 10.45 miles, and
- The percentage of trucks of total average annual daily traffic on posted bridges decreased from 12.6 percent to 9.7 percent.

#### Regulatory Flexibility Act

To comply with the Regulatory Flexibility Act (Pub. L. 96–354, 5 U.S.C. 601–612), FHWA evaluated the effects of this action and determined that it would not have a significant economic impact on a substantial number of small entities. The rule affects State governments and MPOs. State DOTs are not included in the definition of small entity in 5 U.S.C. 601.

The MPOs are considered governmental jurisdictions. The small entity standard for these entities is whether the affected MPOs serve less than 50,000 people. The MPOs impacted by this rule serve urbanized areas with populations of more than 50,000. Therefore, MPOs that incur economic impacts under this rule do not meet the definition of a small entity.

The FHWA certifies that this regulatory action would not have a significant economic impact on a substantial number of small entities.

#### Unfunded Mandates Reform Act of 1995

The FHWA determined that this final rule would not impose unfunded mandates as defined by the UMRA. This rule does not contain a Federal mandate that may result in expenditures of \$151 million or more in any 1 year (2 U.S.C. 1532) for either State, local, and tribal governments in the aggregate, or by the private sector. Additionally, the definition of “Federal mandate” in UMRA excludes financial assistance of the type in which State, local, or tribal governments have authority to adjust their participation in the program in accordance with changes made in the program by the Federal Government. The Federal-aid highway program permits this type of flexibility.

#### Executive Order 13132 (Federalism Assessment)

The FHWA analyzed this final rule in accordance with the principles and criteria contained in E.O. 13132. The FHWA determined that this action would not have sufficient federalism

implications to warrant the preparation of a federalism assessment. The FHWA has also determined that this rule would not preempt any State law or regulation or affect the States’ ability to discharge traditional State governmental functions.

#### Executive Order 12372 (Intergovernmental Review)

The regulations implementing E.O. 12372 regarding intergovernmental consultation on Federal programs and activities apply to this program. This E.O. applies because State and local governments would be directly affected by the proposed regulation, which is a condition on Federal-aid highway funding. Local entities should refer to the Catalog of Federal Domestic Assistance Program Number 20.205 (Highway Planning and Construction) for further information.

#### Paperwork Reduction Act

Under the Paperwork Reduction Act of 1995 (PRA) (44 U.S.C. 3501, *et seq.*), Federal agencies must obtain approval from OMB prior to conducting or sponsoring a collection of information. The FHWA analyzed this final rule and determined that it contains collection of information requirements for the purposes of the PRA.

The final rule provides definitions and outlines processes for bridge and pavement performance measures and reporting. Some burdens in the rule will be realized in other reporting areas as described below. The PRA activities are already covered by existing OMB clearances. The reference numbers for

those clearances are: HPMS information collection, OMB No. 2125–0028 with an expiration of May 31, 2019; and NBI, OMB No. 2125–0501 with an expiration date of April 30, 2018. Any increase in PRA burdens caused by MAP–21 in these areas was addressed in PRA approval requests associated with those rulemakings.

This rule requires the submission of biennial performance reports. The FHWA analyzed this rule under the PRA and has determined the following:

*Respondents:* Approximately 684 applicants consisting of State DOTs, MPOs, Washington, DC, and Puerto Rico.

*Frequency:* Biennially.

*Estimated Average Burden per Response:* Approximately 416 hours to complete and submit the report.

*Estimated Total Annual Burden Hours:* Approximately 54,496 hours annually.

#### *National Environmental Policy Act*

The FHWA analyzed this action for the purpose of the National Environmental Policy Act of 1969, as amended (42 U.S.C. 4321 *et seq.*), and determined that it would not have any effect on the quality of the environment and meets the criteria for the categorical exclusion at 23 CFR 771.117(c)(20).

#### *Executive Order 12630 (Taking of Private Property)*

The FHWA analyzed this rule under E.O. 12630 (Governmental Actions and Interference with Constitutionally Protected Property Rights). The FHWA does not anticipate that this action would affect a taking of private property or otherwise have taking implications under E.O. 12630.

#### *Executive Order 12988 (Civil Justice Reform)*

This action meets applicable standards in sections 3(a) and 3(b)(2) of E.O. 12988 (Civil Justice Reform) to minimize litigation, eliminate ambiguity, and reduce burden.

#### *Executive Order 13045 (Protection of Children)*

The FHWA analyzed this rule under E.O. 13045 (Protection of Children from Environmental Health Risks and Safety Risks). The FHWA certifies that this action would not cause an environmental risk to health or safety that might disproportionately affect children.

#### *Executive Order 13175 (Tribal Consultation)*

The FHWA analyzed this action under E.O. 13175. The FHWA believes

that the action: (1) Would not have substantial direct effects on one or more Indian tribes; (2) would not impose substantial direct compliance costs on Indian tribal governments; and (3) would not preempt tribal laws. The final rule addresses obligations of Federal funds to State DOTs for Federal-aid highway projects and would not impose any direct compliance requirements on Indian tribal governments. Therefore, a tribal summary impact statement is not required.

#### *Executive Order 12898 (Environmental Justice)*

The E.O. 12898 requires that each Federal agency make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minorities and low-income populations. The FHWA has determined that this rule does not raise any environmental justice issues.

#### *Executive Order 13211 (Energy Effects)*

The FHWA analyzed this action under E.O. 13211 (Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use). The FHWA determined that this is not a significant energy action under E.O. 13211 and is not likely to have a significant adverse effect on the supply, distribution, or use of energy. Therefore, a Statement of Energy Effects is not required.

#### *Regulation Identifier Number*

A RIN is assigned to each regulatory action listed in the Unified Agenda of Federal Regulations. The Regulatory Information Service Center publishes the Unified Agenda in April and October of each year. The RIN contained in the heading of this document can be used to cross-reference this action with the Unified Agenda.

#### **List of Subjects in 23 CFR Part 490**

Bridges, Highway safety, Highways and roads, Incorporation by reference, and Reporting and recordkeeping requirements.

Issued in Washington, DC, on January 6, 2017, under authority delegated in 49 CFR 1.85.

**Gregory G. Nadeau,**  
Administrator, Federal Highway Administration.

In consideration of the foregoing, FHWA amends 23 CFR part 490 as follows:

#### **PART 490—NATIONAL PERFORMANCE MANAGEMENT MEASURES**

■ 1. The authority citation for part 490 continues to read as follows:

**Authority:** 23 U.S.C. 134, 135, 148(i), and 150; 49 CFR 1.85.

■ 2. Revise subpart A to read as follows:

##### **Subpart A—General Information**

Sec.

490.101 Definitions.

490.103 Data requirements.

490.105 Establishment of performance targets.

490.107 Reporting on performance targets.

490.109 Assessing significant progress toward achieving the performance targets for the National Highway Performance Program.

490.111 Incorporation by reference.

##### **Subpart A—General Information**

##### **§ 490.101 Definitions.**

Unless otherwise specified, the following definitions apply to this part: *Bridge* as used in this part is defined in § 650.305 of this title, the National Bridge Inspection Standards.

*Full extent* means continuous collection and evaluation of pavement condition data over the entire length of the roadway.

*Highway Performance Monitoring System (HPMS)* is a national level highway information system that includes data on the extent, condition, performance, use, and operating characteristics of the Nation's highways.

*Mainline highways* means the through travel lanes of any highway. Mainline highways specifically exclude ramps, shoulders, turn lanes, crossovers, rest areas, and other pavement surfaces that are not part of the roadway normally travelled by through traffic.

*Measure* means an expression based on a metric that is used to establish targets and to assess progress toward achieving the established targets (e.g., a measure for flight on-time performance is percent of flights that arrive on time, and a corresponding metric is an arithmetic difference between scheduled and actual arrival time for each flight).

*Metric* means a quantifiable indicator of performance or condition.

*Metropolitan Planning Area (MPA)* as used in this part is defined in § 450.104 of this title, Transportation Planning and Programming Definitions.

*National Bridge Inventory (NBI)* is an FHWA database containing bridge information and inspection data for all highway bridges on public roads, on and off Federal-aid highways, including tribally owned and Federally owned

bridges, that are subject to the National Bridge Inspection Standards (NBIS).

*Non-urbanized area* means a single geographic area that comprises all of the areas in the State that are not “urbanized areas” under 23 U.S.C. 101(a)(34).

*Performance period* means a determined time period during which condition/performance is measured and evaluated to: Assess condition/performance with respect to baseline condition/performance; and track progress toward the achievement of the targets that represent the intended condition/performance level at the midpoint and at the end of that time period. The term “performance period” applies to all proposed measures in this part, except the measures proposed for the Highway Safety Improvement Program (HSIP) in subpart B of this part. Each performance period covers a 4-year duration beginning on a specified date (provided in § 490.105).

*Target* means a quantifiable level of performance or condition, expressed as a value for the measure, to be achieved within a time period required by the Federal Highway Administration (FHWA).

#### § 490.103 Data requirements.

(a) *In general.* Unless otherwise noted below, the data requirements in this section applies to the measures identified in subparts C and D of this part. Additional data requirements for specific performance measures are identified in 23 CFR sections—

- (1) 490.309 for the condition of pavements on the Interstate System;
- (2) 490.309 for the condition of pavements on the non-Interstate NHS;
- (3) 490.409 for the condition of bridges on the NHS;
- (4) [Reserved]

(b) *Urbanized area data*—The State DOTs shall submit urbanized area data, including boundaries of urbanized areas, in accordance with the HPMS Field Manual (incorporated by reference, see § 490.111) for the purpose of the additional targets for urbanized and non-urbanized areas in § 490.105(e). The boundaries of urbanized areas shall be identified based on the most recent U.S. Decennial Census, unless FHWA approves adjustments to the urbanized area as provided by 23 U.S.C. 101(a)(34), and these adjustments are submitted to HPMS, available at the time when the State DOT Baseline Performance Period Report is due to FHWA.

(c) [Reserved]

(d) *National Highway System data.* The State DOTs shall document and submit the extent of the NHS in

accordance with the HPMS Field Manual.

#### § 490.105 Establishment of performance targets.

(a) *In general.* State departments of transportation (State DOT) shall establish performance targets for all measures specified in paragraph (c) of this section for the respective target scope identified in paragraph (d) of this section with the requirements specified in paragraph (e) of this section, and the Metropolitan Planning Organizations (MPO) shall establish performance targets for all measures specified in paragraph (c) of this section for respective target scope identified in paragraph (d) of this section with the requirements specified in paragraph (f) of this section.

(b) *Highway Safety Improvement Program measures.* State DOTs and MPOs shall establish performance targets for the Highway Safety Improvement Program (HSIP) measures in accordance with § 490.209.

(c) *Applicable measures.* State DOTs and MPOs that include, within their respective geographic boundaries, any portion of the applicable transportation network shall establish performance targets for the performance measures identified in 23 CFR sections—

- (1) 490.307(a)(1) and 490.307(a)(2) for the condition of pavements on the Interstate System;
- (2) 490.307(a)(3) and 490.307(a)(4) for the condition of pavements on the National Highway System (NHS) (excluding the Interstate); and
- (3) 490.407(c)(1) and 490.407(c)(2) for the condition of bridges on the NHS.

(d) *Target scope.* Targets established by the State DOT and MPO shall, regardless of ownership, represent the transportation network, including bridges that cross State borders, that are applicable to the measures as specified in paragraphs (d)(1) and (2) of this section.

(1) State DOTs and MPOs shall establish Statewide and metropolitan planning area wide targets, respectively, that represent the condition/performance of the transportation network that is applicable to the measures, as specified in 23 CFR sections—

- (i) 490.303 for the condition of pavements on the Interstate System measures specified in §§ 490.307(a)(1) and (a)(2);
- (ii) 490.303 for the condition of pavements on the National Highway System (NHS) (excluding the Interstate) measures specified in §§ 490.307(a)(3) and (a)(4); and

(iii) 490.403 for the condition of bridges on the NHS measures specified in §§ 490.407(c)(1) and (c)(2).

(2) [Reserved]

(3) For the purpose of target establishment in this section, reporting targets and progress evaluation in § 490.107 and significant progress determination in § 490.109, State DOTs shall declare and describe the urbanized area boundaries within the State boundary in the Baseline Performance Period Report required by § 490.107(b)(1). Any changes in urbanized area boundaries during a performance period would not be accounted for until the following performance period.

(e) State DOTs shall establish targets for each of the performance measures identified in paragraph (c) of this section for respective target scope identified in paragraph (d) of this section as follows:

(1) *Schedule*—State DOTs shall establish targets not later than 1 year of the effective date of this rule and for each performance period thereafter, in a manner that allows for the time needed to meet the requirements specified in this section and so that the final targets are submitted to FHWA by the due date provided in § 490.107(b).

(2) *Coordination.* State DOTs shall coordinate with relevant MPOs on the selection of targets in accordance with 23 U.S.C. 135(d)(2)(B)(i)(II) to ensure consistency, to the maximum extent practicable.

(3) *Additional targets for urbanized and non-urbanized areas.* In addition to statewide targets, described in paragraph (d)(1) of this section, State DOTs may, as appropriate, for each statewide target, establish additional targets for portions of the State.

(i) A State DOT shall declare and describe in the Baseline Performance Period Report required by § 490.107(b)(1) the boundaries used to establish each additional target. Any changes in boundaries during a performance period would not be accounted for until the following performance period.

(ii) State DOTs may select any number and combination of urbanized area boundaries and may also select a non-urbanized area boundary for the establishment of additional targets.

(iii) The boundaries used by the State DOT for additional targets shall be contained within the geographic boundary of the State.

(iv) State DOTs shall evaluate separately the progress of each additional target and report that progress as required under §§ 490.107(b)(2)(ii)(B) and (b)(3)(ii)(B).



(4) *Time horizon for targets.* State DOTs shall establish targets for a performance period as follows:

(i) The performance period will begin on:

(A) January 1st of the year in which the Baseline Performance Period Report is due to FHWA and will extend for a duration of 4 years for the measures in paragraphs (c)(1) through (c)(3) of this section; and

(B) [Reserved]

(ii) The midpoint of a performance period will occur 2 years after the beginning of a performance period described in paragraph (e)(4)(i) of this section.

(iii) State DOTs shall establish 2-year targets that reflect the anticipated condition/performance level at the midpoint of each performance period for the measures in paragraphs (c)(1) through (c)(3) of this section.

(iv) State DOTs shall establish 4-year targets that reflect the anticipated condition/performance level at the end of each performance period for the measures in paragraphs (c)(1) through (c)(3) of this section.

(5) *Reporting.* State DOTs shall report 2-year targets, 4-year targets, the basis for each established target, progress made toward the achievement of targets, and other requirements to FHWA in accordance with § 490.107, and the State DOTs shall provide relevant MPO(s) targets to FHWA, upon request, each time the relevant MPOs establish or adjust MPO targets, as described in paragraph (f) of this section.

(6) *Target adjustment.* State DOTs may adjust an established 4-year target in the Mid Performance Period Progress Report, as described in § 490.107(b)(2). State DOTs shall coordinate with relevant MPOs when adjusting their 4-year target(s).

(7) *Phase-in of new requirements for Interstate System pavement condition measures.* The following requirements apply only to the first performance period and the measures in §§ 490.307(a)(1) and (a)(2):

(i) State DOTs shall establish their 4-year targets, required under paragraph (e)(4)(iv) of this section, and report these targets in their Baseline Performance Period Report, required under § 490.107(b)(1);

(ii) State DOTs shall not report 2-year targets, described in paragraph (e)(4)(iii) of this section, and baseline condition/performance in their Baseline Performance Period Report; and

(iii) State DOTs shall update the baseline condition/performance in their Baseline Performance Period Report, with the 2-year condition/performance in their Mid Performance Period

Progress Report, described in § 490.107(b)(2)(ii)(A). State DOTs may also adjust their 4-year targets, as appropriate.

(f) The MPOs shall establish targets for each of the performance measures identified in paragraph (c) of this section for the respective target scope identified in paragraph (d) of this section as follows:

(1) *Schedule.* The MPOs shall establish targets no later than 180 days after the respective State DOT(s) establishes their targets, described in paragraph (e)(1) of this section.

(i) The MPOs shall establish 4-year targets, described in paragraph (e)(4)(iv) of this section, for all applicable measures, described in paragraphs (c) and (d) of this section.

(ii) [Reserved.]

(2) *Coordination.* The MPOs shall coordinate with relevant State DOT(s) on the selection of targets in accordance with 23 U.S.C. 134(h)(2)(B)(i)(II) to ensure consistency, to the maximum extent practicable.

(3) *Target establishment options.* For each performance measure identified in paragraph (c) of this section, MPOs shall establish a target by either:

(i) Agreeing to plan and program projects so that they contribute toward the accomplishment of the relevant State DOT target for that performance measure; or

(ii) Committing to a quantifiable target for that performance measure for their metropolitan planning area.

(4) MPOs serving a multistate metropolitan planning area.—For each performance measure identified in paragraph (c)(1) through (c)(3) of this section, MPOs, with metropolitan planning areas extending across multiple State boundaries shall follow these requirements:

(i) For each measure, MPOs may choose different target establishment options, provided in paragraph (3) of this section, for each portion of the metropolitan area within each State.

(ii) If MPOs choose the option to agree to plan and program projects to contribute toward State DOT targets, in accordance with paragraph (3)(i) of this section, for a measure, then they shall plan and program projects in support of State DOT targets for each portion of the metropolitan area within each State.

(5)–(6) [Reserved]

(7) *MPO response to State DOT target adjustment.*—For the established targets in paragraph (3) of this section, if the State DOT adjusts a 4-year target in the State DOT's Mid Performance Period Progress Report and if, for that respective target, the MPO established a target by supporting the State DOT

target as allowed under paragraph (f)(3)(i) of this section, then the MPO shall, within 180 days, report to the State DOT whether they will either:

(i) Agree to plan a program of projects so that they contribute to the adjusted State DOT target for that performance measure; or

(ii) Commit to a new quantifiable target for that performance measure for its metropolitan planning area.

(8) *Target adjustment.* If the MPO establishes its target by committing to a quantifiable target, described in paragraph (f)(3)(ii) of this section, then the MPOs may adjust its target(s) in a manner that is mutually agreed upon by the State DOT and MPO.

(9) *Reporting.* The MPOs shall report targets and progress toward the achievement of their targets as specified in § 490.107(c). After the MPOs establish or adjust their targets, the relevant State DOT(s) must be able to provide these targets to FHWA, upon request.

#### **§ 490.107 Reporting on performance targets.**

(a) *In general.* All State DOTs and MPOs shall report the information specified in this section for the targets required in § 490.105.

(1) All State DOTs and MPOs shall report in accordance with the schedule and content requirements under paragraphs (b) and (c) of this section, respectively.

(2) For the measures identified in § 490.207(a), all State DOTs and MPOs shall report on performance in accordance with § 490.213.

(3) State DOTs shall report using an electronic template provided by FHWA.

(b) *State Biennial Performance Report.* State DOTs shall report to FHWA baseline condition/performance at the beginning of a performance period and progress achievement at both the midpoint and end of a performance period. State DOTs shall report at an ongoing 2-year frequency as specified in paragraphs (b)(1), (b)(2), and (b)(3) of this section.

(1) *Baseline Performance Period Report.*—(i) *Schedule.* State DOTs shall submit a Baseline Performance Period Report to FHWA by October 1 of the first year in a performance period. State DOTs shall submit their first Baseline Performance Period Report to FHWA by October 1, 2018, and subsequent Baseline Performance Period Reports to FHWA by October 1 every 4 years thereafter.

(ii) *Content.* The State DOT shall report the following information in each Baseline Performance Period Report:

(A) *Targets.* 2-year and 4-year targets for the performance period, as required

in § 490.105(e), and a discussion, to the maximum extent practicable, of the basis for each established target;

(B) *Baseline condition/performance.*—Baseline condition/performance derived from the latest data collected through the beginning date of the performance period specified in § 490.105(e)(4)(i) for each target, required under paragraph (b)(1)(ii)(A) of this section;

(C) *Relationship with other performance expectations.*—A discussion, to the maximum extent practicable, on how the established targets in paragraph (b)(1)(ii)(A) of this section support expectations documented in longer range plans, such as the State asset management plan for the NHS required by 23 U.S.C. 119(e) and the long-range statewide transportation plan provided in part 450 of this chapter; and

(D) *Urbanized area boundaries and population data for targets.*—For the purpose of determining target scope in § 490.105(d) and establishing additional targets for urbanized and non-urbanized areas in § 490.105(e)(3), State DOTs shall document the boundary extent for all applicable urbanized areas and the latest Decennial Census population data, based on information in HPMS.

(2) *Mid Performance Period Progress Report.*—(i) *Schedule.* State DOTs shall submit a Mid Performance Period Progress Report to FHWA by October 1 of the third year in a performance period. State DOTs shall submit their first Mid Performance Period Progress Report to FHWA by October 1, 2020, and subsequent Mid Performance Period Progress Reports to FHWA by October 1 every 4 years thereafter.

(ii) *Content.* The State DOT shall report the following information in each Mid Performance Period Progress Report:

(A) *2-year condition/performance.* The actual condition/performance derived from the latest data collected through the midpoint of the performance period, specified in § 490.105(e)(4), for each State DOT reported target required in paragraph (b)(1)(ii)(A) of this section;

(B) *2-year progress in achieving performance targets.* A discussion of State DOT's progress toward achieving each established 2-year target in paragraph (b)(1)(ii)(A) of this section. The State DOT shall compare the actual 2-year condition/performance in paragraph (b)(2)(ii)(A) of this section, within the boundaries and limits documented in paragraphs (b)(1)(ii)(D) and (b)(1)(ii)(E) of this section, with the respective 2-year target and document in the discussion any reasons for

differences in the actual and target values;

(C) *Investment strategy discussion.* A discussion on the effectiveness of the investment strategies developed and documented in the State asset management plan for the NHS required under 23 U.S.C. 119(e);

(D) [Reserved]

(E) *Target adjustment discussion.*—When applicable, a State DOT may submit an adjusted 4-year target to replace an established 4-year target in paragraph (b)(1)(ii)(A) of this section. If the State DOT adjusts its target, it shall include a discussion on the basis for the adjustment and how the adjusted target supports expectations documented in longer range plans, such as the State asset management plan for the NHS, and the long-range statewide transportation plan. The State DOT may only adjust a 4-year target at the midpoint and by reporting the change in the Mid Performance Period Progress Report.

(F) *2-year significant progress discussion for the National Highway Performance Program (NHPP) targets.*—State DOTs shall discuss the progress they have made toward the achievement of all 2-year targets established for the NHPP measures in § 490.105(c)(1) through (c)(3). This discussion should document a summary of prior accomplishments and planned activities that will be conducted during the remainder of the Performance Period to make significant progress toward that achievement of 4-year targets for NHPP measures;

(G) *Extenuating circumstances discussion on NHPP 2-year targets.*—When applicable, a State DOT may include a discussion on the extenuating circumstance(s), described in § 490.109(e)(5), beyond the State DOT's control that prevented the State DOT from making 2-year significant progress toward achieving NHPP target(s) in paragraph (b)(2)(ii)(F) of this section; and

(H) *NHPP target achievement discussion.*—If FHWA determines that a State DOT has not made significant progress toward the achievement of NHPP targets in a biennial FHWA determination, then the State DOT shall include a description of the actions they will undertake to better achieve NHPP targets as required under § 490.109(f). If FHWA determines under § 490.109(e) that the State DOT has made significant progress, then the State DOT does not need to include this description.

(3) *Full Performance Period Progress Report.*—(i) *Schedule.* State DOTs shall submit a progress report on the full performance period to FHWA by October 1 of the first year following the

reference performance period. State DOTs shall submit their first Full Performance Period Progress Report to FHWA by October 1, 2022, and subsequent Full Performance Period Progress Reports to FHWA by October 1 every 4 years thereafter.

(ii) *Content.* The State DOT shall report the following information for each Full Performance Period Progress Report:

(A) *4-year condition/performance.*—The actual condition/performance derived from the latest data collected through the end of the Performance Period, specified in § 490.105(e)(4), for each State DOT reported target required in paragraph (b)(1)(ii)(A) of this section;

(B) *4-year progress in achieving performance targets.*—A discussion of the State DOT's progress made toward achieving each 4-year target established in paragraph (b)(1)(ii)(A) or in paragraph (b)(2)(ii)(E) of this section, when applicable. The State DOT shall compare the actual 4-year condition/performance in paragraph (b)(3)(ii)(A) of this section, within the boundaries and limits documented in paragraph (b)(1)(ii)(D) and (b)(1)(ii)(E) of this section, with the respective 4-year target and document in the discussion any reasons for differences in the actual and target values;

(C) *Investment strategy discussion.*—A discussion on the effectiveness of the investment strategies developed and documented in the State asset management plan for the NHS required under 23 U.S.C. 119(e);

(D) [Reserved]

(E) *4-year significant progress evaluation for NHPP targets.*—State DOTs shall discuss the progress they have made toward the achievement of all 4-year targets established for the NHPP measures in § 490.105(c)(1) through (c)(3). This discussion shall include a summary of accomplishments achieved during the Performance Period to demonstrate whether the State DOT has made significant progress toward achievement of 4-year targets for NHPP measures.

(F) *Extenuating circumstances discussion on NHPP targets.*—When applicable, a State DOT may include discussion on the extenuating circumstance(s), described in § 490.109(e)(5), beyond the State DOT's control that prevented the State DOT from making a 4-year significant progress toward achieving NHPP targets, described in paragraph (b)(3)(ii)(E) of this section;

(G) *NHPP Target Achievement Discussion.*—If FHWA determines that a State DOT has not made significant progress toward the achievement of



NHPP targets in a biennial FHWA determination, then the State DOT shall include a description of the actions they will undertake to better achieve NHPP targets as required under § 490.109(f). If FHWA determines in § 490.109(e) that the State DOT has achieved significant progress, then the State DOT does not need to include this description.

(c) *MPO Report.* The MPOs shall establish targets in accordance with § 490.105 and report targets and progress toward the achievement of their targets in a manner that is consistent with the following:

(1) The MPOs shall report their established targets to their respective State DOT in a manner that is documented and mutually agreed upon by both parties.

(2) The MPOs shall report baseline condition/performance and progress toward the achievement of their targets in the system performance report in the metropolitan transportation plan in accordance with Part 450 of this chapter.

**§ 490.109 Assessing significant progress toward achieving the performance targets for the National Highway Performance Program.**

(a) *In general.* The FHWA will assess each of the State DOT targets separately for the NHPP measures specified in § 490.105(c)(1) through (c)(3) to determine the significant progress made toward the achievement of those targets.

(b) *Frequency.* The FHWA will determine whether a State DOT has or has not made significant progress toward the achievement of NHPP targets as described in paragraph (e) of this section at the midpoint and the end of each performance period.

(c) *Schedule.* The FHWA will determine significant progress toward the achievement of a State DOT's NHPP targets after the State DOT submit the Mid Performance Period Progress Report for progress toward the achievement of 2-year targets, and again after the State DOT submit the Full Performance Period Progress Report for progress toward the achievement of 4-year targets. The FHWA will notify State DOTs of the outcome of the determination of the State DOT's ability to make significant progress toward the achievement of its NHPP targets.

(d) *Source of data/information.* The FHWA will use the following sources of information to assess NHPP condition and performance progress:

(1) Data contained within the HPMS on June 15 of the year in which the significant progress determination is made that represents conditions from the prior year for targets established for

Interstate System pavement condition measures, as specified in § 490.105(c)(1);

(2) Data contained within the HPMS on August 15 of the year in which the significant progress determination is made that represents conditions from the prior year for targets established for non-Interstate NHS pavement condition measures, as specified in § 490.105(c)(2);

(3) The most recently available data contained within the NBI as of June 15 of the year in which the significant progress determination is made for targets established for NHS bridge condition measures, as specified in § 490.105(c)(3).

(4) Baseline condition data contained in HPMS and NBI of the year in which the Baseline Period Performance Report is due to FHWA that represents baseline conditions for the performance period.

(e) *Significant progress determination for individual NHPP targets.*—(1) *In general.* The FHWA will biennially assess whether the State DOTs has achieved or made significant progress toward each target established by the State DOT for the NHPP measures described in § 490.105(c)(1) through (c)(3). The FHWA will assess the significant progress of each statewide target separately using the condition/performance data/information sources described in paragraph (d) of this section. The FHWA will not assess the progress achieved for any additional targets a State DOT may establish under § 490.105(e)(3).

(2) *Significant progress toward individual NHPP targets.*—The FHWA will determine that a State DOT has made significant progress toward the achievement of each 2-year or 4-year NHPP target if either:

(i) The actual condition/performance level is better than the baseline condition/performance; or

(ii) The actual condition/performance level is equal to or better than the established target.

(3) *Phase-in of new requirements for Interstate System pavement condition measures.*—The following requirements shall only apply to the first performance period and the Interstate System pavement condition targets, described in § 490.105(e)(7):

(i) At the midpoint of the first performance period, FHWA will not make a determination of significant progress toward the achievement of 2-year targets for Interstate System pavement condition measures.

(ii) The FHWA will classify the assessment of progress toward the achievement of targets in paragraph (e)(3)(i) of this section as “progress not

determined” so that they will be excluded from the requirement under paragraph (e)(2) of this section.

(4) *Insufficient data and/or information.* The FHWA will determine that a State DOT has not made significant progress toward the achievement of an individual NHPP target if:

(i) A State DOT does not submit a required report, individual target, or other information as specified in § 490.107 for the each of the measures in § 490.105(c);

(ii) The data contained in HPMS does not meet the requirements under § 490.313(b)(4)(i) by the data extraction date specified in paragraph (d)(1) of this section for the each of the Interstate System pavement condition measures in § 490.105(c)(1);

(iii) The data contained in HPMS does not meet the requirements under § 490.313(b)(4)(i) by the data extraction date specified in paragraph (d)(2) of this section for the each of the non-Interstate NHS pavement condition measures in § 490.105(c)(2);

(iv) A State DOT reported data is not cleared in the NBI by the data extraction date specified in paragraph (d)(3) of this section for each of the NHS bridge condition measures in § 490.105(c)(3); or

(v) The data was determined insufficient, as described in paragraphs (e)(4)(ii) through (iv) of this section, in the year in which the Baseline Period Performance Report is due to FHWA for the measures in § 490.105(c), and the actual condition/performance level is not equal to or better than the established target.

(5) *Extenuating circumstances.* The FHWA will consider extenuating circumstances documented by the State DOT in the assessment of progress toward the achievement of NHPP targets in the relevant State Biennial Performance Report, provided in § 490.107.

(i) The FHWA will classify the assessment of progress toward the achievement of an individual 2-year or 4-year target as “progress not determined” if the State DOT has provided an explanation of the extenuating circumstances beyond the control of the State DOT that prevented it from making significant progress toward the achievement of a 2-year or 4-year target and the State DOT has quantified the impacts on the condition/performance that resulted from the circumstances, which are:

(A) Natural or man-made disasters that caused delay in NHPP project delivery, extenuating delay in data



collection, and/or damage/loss of data system;

(B) Sudden discontinuation of Federal Government furnished data due to natural and man-made disasters or sudden discontinuation of Federal Government furnished data due to lack of funding; and/or

(C) New law and/or regulation directing State DOTs to change metric and/or measure calculation.

(ii) If the State DOT's explanation, described in paragraph (e)(5)(i) of this section, is accepted by FHWA, FHWA will classify the progress toward achieving the relevant NHPP target(s) as "progress not determined," and those targets will be excluded from the requirement in paragraph (e)(2) of this section.

(f) *Performance achievement.* If FHWA determines that a State DOT has not made significant progress toward achieving the NHPP targets, then State DOTs shall include as part of the performance target report under sec. 150(e) [the Biennial Performance Report] a description of the actions the State DOT will undertake to achieve the targets related to the measure in which significant progress was not achieved as follows:

(1) If significant progress is not made for either target established for the Interstate System pavement condition measures, § 490.307(a)(1) and (a)(2), then the State DOT shall document the actions they will take to achieve Interstate Pavement condition targets;

(2) If significant progress is not made for either target established for the Non-Interstate System pavement condition measures, § 490.307(a)(3) and (a)(4), then the State DOT shall document the actions they will take to achieve Non-Interstate Pavement condition targets.

(3) If significant progress is not made for either target established for the NHS bridge condition measures, § 490.407(c)(1) and (c)(2), then the State DOT shall document the actions they will take to achieve the NHS bridge condition targets.

(4)–(5) [Reserved]

(6) The State DOT should, within 6 months of the significant progress determination, amend its Biennial Performance Report to document the information specified in this paragraph to ensure actions are being taken to achieve targets.

#### § 490.111 Incorporation by reference.

(a) Certain material is incorporated by reference into this Part with the approval of the Director of the Federal Register under 5 U.S.C. 552(a) and 1 CFR part 51. To enforce any edition other than that specified in this section,

FHWA must publish a notice of change in the **Federal Register** and the material must be available to the public. All approved material is available for inspection at the Federal Highway Administration, Office of Highway Policy Information (202–366–4631) 1200 New Jersey Avenue SE., Washington, DC 20590, [www.fhwa.dot.gov](http://www.fhwa.dot.gov) and is available from the sources listed below. It is also available for inspection at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call 202–741–6030 or go to [http://www.archives.gov/federal\\_register/code\\_of\\_federal\\_regulations/ibr\\_locations.html](http://www.archives.gov/federal_register/code_of_federal_regulations/ibr_locations.html).

(b) The Federal Highway Administration, 1200 New Jersey Avenue SE., Washington, DC 20590, [www.fhwa.dot.gov](http://www.fhwa.dot.gov).

(1) Highway Performance Monitoring System (HPMS) Field Manual, IBR approved for §§ 490.103, 490.309, 490.311, and 490.319.

(2) Recording and Coding Guide for the Structure Inventory and Appraisal of the Nation's Bridges, includes: Errata Sheet for Coding Guide 06/2011, Report No. FHWA–PD–96–001, December 1995, IBR approved for §§ 490.409 and 490.411.

(c) The American Association of State Highway and Transportation Officials, 444 North Capitol Street NW., Suite 249, Washington, DC 20001, (202) 624–5800, [www.transportation.org](http://www.transportation.org).

(1) AASHTO Standard M328–14, Standard Specification for Transportation Materials and Methods of Sampling and Testing, Inertial Profiler, 2014, 34th/2014 Edition, IBR approved for § 490.309.

(2) AASHTO Standard R57–14, Standard Specification for Transportation Materials and Methods of Sampling and Testing, Standard Practice for Operating Inertial Profiling Systems, 2014, 34th/2014 Edition, IBR approved for § 490.309.

(3) AASHTO Standard R48–10 (2013), Standard Specification for Transportation Materials and Methods of Sampling and Testing, Standard Practice for Determining Rut Depth in Pavements, 2014, 34th/2014 Edition, IBR approved for § 490.309.

(4) AASHTO Standard R36–13, Standard Specification for Transportation Materials and Methods of Sampling and Testing, Standard Practice for Evaluating Faulting of Concrete Pavements, 2014, 34th/2014 Edition, IBR approved for § 490.309.

(5) AASHTO Standard R43–13, Standard Specification for Transportation Materials and Methods

of Sampling and Testing, Standard Practice for Quantifying Roughness of Pavement, 2014, 34th/2014 Edition, IBR approved for § 490.311.

■ 3. Add subpart C to read as follows:

#### Subpart C—National Performance Management Measures for the Assessing Pavement Condition

Sec.

490.301 Purpose.

490.303 Applicability.

490.305 Definitions.

490.307 National performance management measures for assessing pavement condition.

490.309 Data requirements.

490.311 Calculation of pavement metrics.

490.313 Calculation of performance management measures.

490.315 Establishment of minimum level for condition of pavements.

490.317 Penalties for not maintaining minimum Interstate System pavement condition.

490.319 Other requirements.

#### Subpart C—National Performance Management Measures for the Assessing Pavement Condition

##### § 490.301 Purpose.

The purpose of this subpart is to implement the following statutory requirements of 23 U.S.C. 150(c)(3) to:

(a) Establish measures for State DOTs and MPOs to assess the condition of pavements on the Interstate System;

(b) Establish measures for State DOTs and MPOs to assess the condition of pavements on the NHS (excluding the Interstate);

(c) Establish minimum levels for pavement condition on the Interstate System, only for purposes of carrying out 23 U.S.C. 119(f)(1);

(d) Establish data elements that are necessary to collect and maintain standardized data to carry out a performance-based approach; and

(e) Consider regional differences in establishing the minimum levels for pavement conditions on the Interstate System.

##### § 490.303 Applicability.

The performance measures in this subpart are applicable to the mainline highways on the Interstate System and on the non-Interstate NHS.

##### § 490.305 Definitions.

The following definitions are only applicable to this subpart, unless otherwise provided:

*Asphalt pavements* means pavements where the top-most surface is constructed with asphalt materials. These pavements are coded in the HPMS as having any one of the following Surface Types:

Code	Surface_type
2 .....	Bituminous.
6 .....	Asphalt-Concrete (AC) Overlay over Existing AC Pavement.
7 .....	AC Overlay over Existing Jointed Concrete Pavement.
8 .....	AC (Bituminous Overlay over Existing CRCP).

*Continuously Reinforced Concrete Pavements (CRCP)* means pavements where the top-most surface is

constructed of reinforced Portland cement concrete with no joints. These

pavements are coded in the HPMS as having the following Surface Type:

Code	Surface_type
5 .....	CRCP—Continuously Reinforced Concrete Pavement.

*Cracking* means an unintentional break in the continuous surface of a pavement.

*Cracking Percent* means the percentage of pavement surface exhibiting cracking as follows:

(1) For asphalt pavements, Cracking Percent is the percentage of the area of the pavement section, exhibiting visible cracking.

(2) For jointed concrete pavements, Cracking Percent is the percentage of concrete slabs exhibiting cracking.

(3) For CRCP, the Cracking Percent is the percentage of pavement surface with longitudinal cracking and/or punchouts, spalling or other visible defects.

*Faulting* means a vertical misalignment of pavement joints in Portland Cement Concrete Pavements.

*International Roughness Index (IRI)* means a statistic used to estimate the amount of roughness in a measured longitudinal profile. The IRI is computed from a single longitudinal profile using a quarter-car simulation, as described in the report: "On the Calculation of IRI from Longitudinal Road Profile" (Sayers, M.W., Transportation Research Board 1501, Transportation Research Board, Washington, DC 1995).

*Jointed concrete pavements* means pavements where the top-most surface is constructed of Portland cement concrete with joints. It may be constructed of either reinforced or unreinforced (plain) concrete. It is coded in the HPMS as having any one of the following Surface Types:

Code	Surface_type
3 .....	Jointed Plain Concrete Pavement (includes whitetopping).
4 .....	Jointed Reinforced Concrete Pavement (includes whitetopping).
9 .....	Unbonded Jointed Concrete Overlay on PCC Pavement.
10 .....	Bonded PCC Overlay on PCC Pavement.

*Pavement* means any hard surfaced travel lanes of any highway.

*Pavement section* means a nominally 0.1 mile-long reported segment that defines the limits of pavement condition metrics required by FHWA.

*Present Serviceability Rating (PSR)* means an observation based system used to rate pavements.

*Punchout* means a distress specific to CRCP described as the area between two closely spaced transverse cracks and between a short longitudinal crack and the edge of the pavement (or a longitudinal joint) that is breaking up, spalling, or faulting.

*Rutting* means longitudinal surface depressions in the pavement derived from measurements of a profile transverse to the path of travel on a highway lane. It may have associated transverse displacement.

*Sampling* as applied to pavements, means measuring pavement conditions on a short section of pavement as a statistical representation for the entire section. Sampling is not to be used to measure or rate NHS pavement conditions.

#### **§ 490.307 National performance management measures for assessing pavement condition.**

(a) To carry out the NHPP, the performance measures for State DOTs to assess pavement condition are:

- (1) Percentage of pavements of the Interstate System in Good condition;
- (2) Percentage of pavements of the Interstate System in Poor condition;
- (3) Percentage of pavements of the non-Interstate NHS in Good condition; and
- (4) Percentage of pavements of the non-Interstate NHS in Poor condition.

(b) State DOTs will collect data using the methods described in § 490.309 and will process this data to calculate individual pavement metrics for each section of pavement that will be reported to FHWA as described in § 490.311. State DOTs and FHWA will

use the reported pavement metrics to compute an overall performance of Good, Fair, or Poor, for each section of pavement as described in § 490.313.

#### **§ 490.309 Data requirements.**

(a) The performance measures identified in § 490.307 are to be computed using methods in § 490.313 from the four condition metrics and three inventory data elements contained within the HPMS that shall be collected and reported following the HPMS Field Manual, which is incorporated by reference into this subpart (see § 490.111). State DOTs shall report four condition metrics for each pavement section: IRI, rutting, faulting, and Cracking\_Percent. State DOTs shall also report three inventory data elements as directed in the HPMS Field Manual: Through Lanes, Surface Type, and Structure Type. All pavement data collected after January 1, 2018 for Interstate highways and January 1, 2020 for non-Interstate National Highway System routes shall meet the requirements of this section.

(b) State DOTs shall collect data in accordance with the following relevant HPMS requirements to report IRI, rutting (asphalt pavements), faulting (jointed concrete pavements), and Cracking percent. State DOTs will be permitted to report present serviceability rating (PSR) for specific locations in accordance with the HPMS requirements as an alternative where posted speed limits are less than 40 miles per hour.

(1) For the Interstate System the following shall apply for all the pavement condition metrics:

(i) State DOTs shall collect data—

(A) From the full extent of the mainline highway;

(B) In the rightmost travel lane or one consistent lane for all data if the rightmost travel lane carries traffic that is not representative of the remainder of the lanes or is not readily accessible due

to closure, excessive congestion, or other events impacting access;

(C) Continuously collected in a manner that will allow for reporting in nominally uniform pavement section lengths of 0.10 mile (528 feet); shorter pavement sections are permitted only at the beginning of a route, end of a route, at bridges, at locations where surface type changes or other locations where a pavement section length of 0.10 mile is not achievable; the maximum length of pavement sections shall not exceed 0.11 mile (580.8 feet);

(D) In at least one direction of travel; and

(E) On an annual frequency.

(ii) Estimating conditions from data samples of the full extent of the mainline highway is not permitted.

(iii) State DOTs may collect and report pavement condition data separately for each direction of divided highways on the Interstate System. Averaging across directions is not permitted. When pavement condition data is collected in one direction only, the measured conditions shall apply to all lanes in both directions for that pavement section for purposes of this part.

(iv) For the portions of the Interstate mainline highway pavements where posted speed limits are less than 40 MPH (e.g., border crossings, toll plazas), State DOTs may collect and report the Present Serviceability Rating (PSR) as an alternative to the IRI, Cracking\_Percent, rutting, and faulting in this pavement section and shall follow the following requirements:

(A) The PSR shall be determined as a value from 0 to 5 per the procedures prescribed in the HPMS Field Manual;

(B) Alternative pavement condition methods may be allowed to estimate a PSR with prior approval from FHWA of the method of correlation between their condition determination and PSR as required in the HPMS Field Manual;

(C) The PSR data shall be continuously collected in a manner that will allow for reporting in uniform pavement section lengths of 0.10 mile (528 feet); shorter pavement sections are permitted only at the beginning of a route, end of a route, at bridges, at locations where surface type changes or other locations where a pavement section length of 0.10 mile is not achievable; the maximum length of pavement sections shall not exceed 0.11 mile (580.8 feet);

(D) The PSR data shall be collected in at least one direction of travel; and

(E) The PSR data shall be collected on an annual frequency.

(2) For the non-Interstate NHS the following shall apply:

(i) For the IRI metric, State DOTs shall collect and report data:

(A) From the full extent of the mainline highway;

(B) In the rightmost travel lane or one consistent lane for all data if the rightmost travel lane is not accessible;

(C) Continuously collected in a manner that will allow for reporting in uniform pavement section lengths of 0.10 mile (528 feet); shorter pavement sections are permitted only at the beginning of a route, end of a route, at bridges, at locations where surface type changes or other locations where a pavement section length of 0.10 mile is not achievable; the maximum length of pavement sections shall not exceed 0.11 mile (580.8 feet)

(D) In one direction of travel; and

(E) On a biennial frequency.

(F) Estimating IRI metrics from data samples of the full extent of the mainline will not be permitted.

(ii) For the Cracking percent, rutting and faulting metrics, State DOTs shall collect data—

(A) On the full extent (no sampling) of the mainline highway;

(B) In the rightmost travel lane or one consistent lane for all data if the rightmost travel lane is not accessible;

(C) Continuously collected in a manner that will allow for reporting in uniform pavement section lengths of 0.10 mile (528 feet); shorter pavement sections are permitted only at the beginning of a route, end of a route, at bridges, at locations where surface type changes or other locations where a pavement section length of 0.10 mile is not achievable; the maximum length of pavement sections shall not exceed 0.11 mile (580.8 feet)

(D) In one direction of travel; and

(E) On at least a biennial frequency.

(F) Estimating conditions from data samples of the full extent of the mainline highway will not be permitted.

(iii) For the portions of mainline highways where posted speed limits of less than 40 MPH, State DOTs may collect the Present Serviceability Rating (PSR) as an alternative to the IRI, Cracking\_Percent, rutting, and faulting pavement condition metrics, in paragraphs (b)(2)(i) and (ii) of this section, and shall follow the following requirements:

(A) The PSR shall be determined as a 0 to 5 value per the procedures prescribed in the HPMS Field Manual;

(B) Alternative pavement condition methods may be allowed to estimate a PSR with prior approval from FHWA of the method of correlation between their condition determination and PSR as required in the HPMS Field Manual;

(C) The PSR data shall be continuously collected in a manner that

will allow for reporting in uniform pavement section lengths of 0.10 mile (528 feet); shorter pavement sections are permitted only at the beginning of a route, end of a route, at bridges, at locations where surface type changes or other locations where a pavement section length of 0.10 mile is not achievable; the maximum length of pavement sections shall not exceed 0.11 mile (580.8 feet);

(D) The PSR data shall be collected in one direction of travel; and

(E) The PSR data shall be collected on at least a biennial frequency.

(3) Data collection methods for each of the condition metrics shall conform to the following:

(i) The device to collect data needed to calculate the IRI metric shall be in accordance with American Association of State Highway Transportation Officials (AASHTO) Standard M328–14, Standard Specification for Transportation Materials and Methods of Sampling and Testing, Standard Equipment Specification for Inertial Profiler (incorporated by reference, see § 490.111).

(ii) The method to collect data needed to calculate the IRI metric shall be in accordance with AASHTO Standard R57–14, Standard Specification for Transportation Materials and Methods of Sampling and Testing, Standard Practice for Operating Inertial Profiling Systems (incorporated by reference, see § 490.111).

(iii) For highways with a posted speed limit less than 40 miles per hour, an alternate method for estimation of IRI is permitted as described in § 490.309(b)(1)(iv) or § 490.309(b)(2)(iii) may be used in lieu of measuring IRI, cracking, rutting and faulting.

(iv) The method to collect data needed to determine the Cracking\_Percent metric for all pavement types except CRCP shall be manual, semi-automated, or fully automated in accordance with the HPMS Field Manual (incorporated by reference, see § 490.111).

(v) For CRCP the method to collect the data needed to determine the Cracking\_Percent metric is described in the HPMS Field Manual (incorporated by reference, see § 490.111) and includes longitudinal cracking and/or punchouts, spalling, or other visible defects.

(vi) For asphalt pavements, the method to collect data needed to determine the rutting metric shall either be:

(A) A 5-Point Collection of Rutting Data method in accordance with AASHTO Standard R48–10, Standard Specification for Transportation Materials and Methods of Sampling and



Testing, Standard Practice for Determining Rut Depth in Pavements (incorporated by reference, see § 490.111); or

(B) An Automated Transverse Profile Data method in accordance with the HPMS Field Manual (incorporated by reference, see § 490.111).

(vii) For jointed concrete pavements, the method to collect data needed to determine the faulting metric shall be in accordance with AASHTO Standard R36–13, Standard Specification for Transportation Materials and Methods of Sampling and Testing, Standard Practice for Evaluating Faulting of Concrete Pavements (incorporated by reference, see § 490.111).

(c) State DOTs shall collect data in accordance with the following relevant HPMS requirements to report Through Lanes, Surface Type, and Structure Type.

(1) State DOTs shall collect data:

(i) For the full extent of the mainline highway of the NHS;

(ii) In at least one direction of travel for the Interstate System and in one direction of travel for the non-Interstate NHS; and

(iii) On an annual frequency on the Interstate routes and on at least a biennial frequency on non-Interstate NHS routes.

(2) Estimating data elements from samples of the full extent of the mainline highway is not permitted.

**§ 490.311 Calculation of pavement metrics.**

(a) The condition metrics and inventory data elements needed to calculate the pavement performance measures shall be calculated in accordance with the HPMS Field Manual (incorporated by reference, see § 490.111), except as noted below.

(b) State DOTs shall calculate metrics in accordance with the following relevant HPMS requirements.

(1) For all pavements, the IRI metric:

(i) Shall be computed from pavement profile data in accordance with AASHTO Standard R43–13, Standard Specification for Transportation Materials and Methods of Sampling and Testing, Standard Practice for Quantifying Roughness of Pavement, 2014, 34th/2014 Edition, AASHTO, 1–56051–606–4 (incorporated by reference, see § 490.111);

(ii) Shall be reported for all pavements as the average value in inches per mile for each section; and

(iii) Shall not be estimated from a PSR or other observation-based method except where permitted in § 490.309(b)(3)(iii).

(2) For asphalt pavements—

(i) The Cracking\_Percent metric shall be computed as the percentage of the

total area containing visible cracks to the nearest whole percent in each section; and

(ii) The rutting metric shall be computed as the average depth of rutting, in inches to the nearest 0.01 inches, for the section.

(3) For CRCP, the Cracking\_Percent metric shall be computed as the percentage of the area of the section to the nearest whole percent exhibiting longitudinal cracking, punchouts, spalling, or other visible defects. Transverse cracking shall not be considered in the Cracking\_Percent metric.

(4) For jointed concrete pavements—

(i) The Cracking\_Percent metric shall be computed as the percentage of slabs to the nearest whole percent within the section that exhibit cracking;

(ii) Partial slabs shall contribute to the section that contains the majority of the slab length; and

(iii) The faulting metric shall be computed as the average height, in inches to the nearest 0.01 inch, of faulting between pavement slabs for the section.

(5) For the mainline highways on the non-Interstate NHS with posted speed limits of less than 40 MPH—

(i) The present serviceability rating (PSR) may be used as an alternative to the IRI, Cracking\_Percent, rutting, and faulting pavement condition metrics.

(ii) The PSR shall be determined as a 0 to 5 value per the procedures prescribed in the HPMS Field Manual.

(iii) Alternative pavement condition methods may be allowed to estimate a PSR with prior approval from FHWA of the method of correlation between their condition determination and PSR as required in the HPMS Field Manual.

(c) State DOTs shall report the four pavement metrics listed in § 490.309(a) as calculated following the requirements in paragraphs (a) and (b) of this section in accordance with the following relevant HPMS requirements:

(1) Pavement condition metrics shall be reported to the HPMS in uniform section lengths of 0.1 mile (528 feet); shorter sections are permitted only at the beginning of a route, the end of a route, at bridges, or other locations where a section length of 0.1 mile is not achievable; and the maximum length of sections shall not exceed 0.11 mile (580.8 feet)

(2) Each measured section shall have a single value for each of the relevant condition metrics. Sections where condition is estimated from PSR will have one value for the overall condition.

(3) The time and location reference shall be reported for each section as follows:

(i) The State Code, Route ID, Begin Point, and End Point shall be reported as specified in the HPMS field manual (incorporated by reference, see § 490.111) for each of the four condition metrics.

(ii) The Year Record shall be reported as the four digit year for which the data represents for each of the four condition metrics; and

(iii) The Value Date shall be reported as the month and year of data collection for each of the four condition metrics.

(4) Sections for the four condition metrics shall be reported to the HPMS for the Interstate System by April 15 of each year for the data collected during the previous calendar year.

(5) Sections for the four condition metrics shall be reported to the HPMS for the non-Interstate NHS by June 15 of each year for the data collected during the previous calendar year(s).

(d) The three inventory data elements, Through Lanes, Surface Type, and Structure Type shall be reported to the HPMS as directed in Chapter 4 of the HPMS Field Manual for the entire extent of the NHS.

(1) Section Lengths for the three inventory data items are not required to meet the 0.1 mile nominal length but may be any logical length as defined in the HPMS Field Manual.

(2) The three inventory data elements shall be reported to the HPMS for the Interstate System by April 15 of each year.

(3) The three inventory data elements shall be reported to the HPMS for the non-Interstate NHS by June 15 of the each year that data reporting is required.

**§ 490.313 Calculation of performance management measures.**

(a) The pavement measures in § 490.307 shall be calculated in accordance with this section and used by State DOTs and MPOs to carry out the pavement condition related requirements of this part, and by FHWA to make the significant progress and minimum condition determinations specified in §§ 490.109 and 490.317, respectively.

(b) The performance measure for pavements shall be calculated based on the data collected in § 490.309 and pavement condition metrics computed in § 490.311. The performance measure for pavements shall be based on three condition ratings of Good, Fair, and Poor calculated for each pavement section. The ratings are determined as follows:

(1) IRI rating shall be determined for all pavement types using the following criteria. If an IRI value of a pavement section is:—

(i) Less than 95, the IRI rating for the pavement section is Good;  
(ii) Between 95 and 170, the IRI rating for the pavement section is Fair; and  
(iii) Greater than 170, the IRI rating for the pavement section is Poor.

(2) Cracking condition shall be determined using the following criteria:

(i) For asphalt pavement sections—

(A) If the Cracking\_Percent value of a section is less than 5 percent, the cracking rating for the pavement section is Good;

(B) If the Cracking\_Percent value of a section is equal to or greater than 5 percent and less than or equal to 20 percent the cracking rating for the pavement section is Fair; and

(C) If the Cracking\_Percent value of a section is greater than 20 percent the cracking rating for the pavement section is Poor.

(ii) For jointed concrete pavement sections—

(A) If the Cracking\_Percent value of a section is less than 5 percent, the cracking rating for the pavement section is Good;

(B) If the Cracking\_Percent value of a section is equal to or greater than 5 percent and less than or equal to 15 percent the cracking rating for the pavement section is Fair; and

(C) If the Cracking\_Percent value of a section is greater than 15 percent the cracking rating for the pavement section is Poor.

(iii) For CRCP sections:

(A) If the Cracking\_Percent value of a section is less than 5 percent, the cracking rating for the pavement section is Good;

(B) If the Cracking\_Percent value of a section is equal to or greater than 5 percent and less than or equal to 10 percent, the cracking rating for the pavement section is Fair; and

(C) If the Cracking\_Percent value of a section is greater than 10 percent, the cracking rating for the pavement section is Poor.

(3) Rutting or faulting rating shall be determined using the following criteria:

(i) For asphalt pavement:

(A) If the rutting value of a section is less than 0.20 inches, the rutting rating for the pavement section is Good;

(B) If the rutting value of a section is equal to or greater than 0.20 inches and less than or equal to 0.40 inches, the rutting rating for the pavement section is Fair; and

(C) If the rutting value of a section is greater than 0.40 inches, the rutting rating for the pavement section is Poor.

(ii) For jointed concrete pavement:

(A) If the faulting value of a section is less than 0.10 inches, the faulting rating for the pavement section is Good;

(B) If the faulting value of a section is equal to or greater than 0.10 inches and less than or equal to 0.15 inches, the faulting rating for the pavement section is Fair; and

(C) If the faulting value of a section is greater than 0.15 inches, the faulting rating for the pavement section is Poor.

(4) The FHWA will determine that a reported section in HPMS has a missing, invalid or unresolved data on the dates specified in § 490.317(b) for Interstate System and § 490.109(d)(2) and (d)(4) for non-Interstate NHS, if a reported section does not meet any one of the data requirements specified in §§ 490.309 and 490.311(c) or that reported section does not provide sufficient data to determine its Overall Condition specified in paragraphs (c) through (f) of this section:

(i) Total mainline lane-miles of missing, invalid, or unresolved sections for Interstate System and non-Interstate NHS shall be limited to no more than 5 percent of the total lane miles less the sections excluded in § 490.313(f)(1). For each pavement section without collected its condition metrics and inventory data, State DOTs shall note in the HPMS submittal with a specific code identified in the HPMS Field Manual (incorporated by reference, see § 490.111) noting the reason it was not collected.

(ii) Calculation of overall pavement conditions in any State meeting the requirements of § 490.309(b) shall be based only on sections containing data reported in the HPMS Submittal as of the submission dates required in § 490.311(c)(4) and (5). State DOTs not meeting the requirements of § 490.309(b) will be considered as not in compliance with § 420.105(b) requiring State DOTs to submit data to the HPMS and not in compliance with § 490.107 requiring reporting on performance targets. Failure to report data meeting the requirements of § 490.309(b) by the submission dates for the Interstate System will be considered as not meeting the minimum requirements for pavement conditions on the Interstate System and that State DOT is subject to the penalties in § 490.315.

(c) The Overall condition for asphalt and jointed concrete pavement sections shall be determined based on the ratings for IRI, Cracking\_Percent, rutting and faulting, as described in paragraphs (b)(1), (b)(2), (b)(3) and (b)(4) of this section, respectively, for each section as follows:

(1) A pavement section shall be rated an overall condition of Good only if the section is exhibiting Good ratings for all three conditions (IRI, Cracking\_Percent, and rutting or faulting);

(2) A pavement section shall be rated an overall condition of Poor if two or more of the three conditions are exhibiting Poor ratings (at least two ratings of Poor for IRI, Cracking\_Percent, and rutting or faulting).

(3) A pavement section shall be rated an overall condition of Fair if it does not meet the criteria in paragraphs (c)(1) or (c)(2) of this section.

(4) For sections on roadways where the posted speed limit is less than 40 MPH and where the State DOT has reported PSR in lieu of the IRI, Cracking\_Percent, rutting, and faulting metrics the PSR condition level shall be determined using the following criteria:

(i) If the PSR of a section is equal to or greater than 4.0 the PSR rating for the pavement section is Good;

(ii) If the PSR of a section is less than 4.0 and greater than 2.0 the PSR rating for the pavement section is Fair; and

(iii) If the PSR of a section is less than or equal to 2.0 the PSR rating for the pavement section is Poor.

(d) The Overall condition for CRCP sections shall be determined based on two ratings of IRI and Cracking\_Percent, as described in paragraphs (b)(1) and (b)(2) of this section or based on PSR where appropriate as described in paragraph (c)(4) of this section, respectively, for each section as follows:

(1) A pavement section shall be rated an overall condition of Good only if the section is exhibiting Good ratings for both conditions (IRI and Cracking\_Percent);

(2) A pavement section shall be rated an overall condition of Poor if it exhibits Poor ratings for both conditions (IRI and Cracking\_Percent);

(3) A pavement section shall be rated an overall condition of Fair if it does not meet the criteria in paragraphs (d)(1) or (d)(2) of this section.

(4) For pavement sections that are on roadways with a posted speed limit of less than 40 MPH where the State DOT reported the PSR metric in lieu of the IRI, Cracking\_Percent, faulting, and rutting metrics the pavement section shall be rated an overall condition equal to the PSR condition rating as described in section (c)(4) above

(e) State DOTs shall not be subject to paragraphs (c) and (d) of this section for Pavements on the until after the data collection cycle ending December 31, 2018, for Interstate highways and December 31, 2021, for the non-Interstate NHS. During this transition period, the Overall condition for all pavement types will be based on IRI rating, as described in paragraph (b)(1) of this section, or on PSR as described in paragraphs (c)(4) or (d)(4) of this section.

(f) The pavement condition measures in § 490.307 shall be computed as described below. The measures shall be used for establishing targets in accordance with § 490.105 and reporting the conditions of the pavements in the biennial performance reporting required in § 490.107 as follows:

(1) Bridges shall be excluded prior to computing all pavement condition measures by removing the sections where the Structure Type data item in the HPMS is coded as 1. Sections that have an unpaved surface or an “other” surface type (such as cobblestone, planks, brick) shall be excluded prior to computing all pavement condition

measures by removing the sections where the Surface Type data item in the HPMS is coded as 1 or as 11.

(2) For § 490.307(a)(1) the measure for percentage of lane-miles of the Interstate System in Good condition shall be computed to the one tenth of a percent as follows:

$$100 \times \frac{\sum_{g=1}^{Good} \{ \langle End\_Point - Begin\_Point \rangle \times Through\_lanes \}_{section\ g}}{\sum_{t=1}^{Total} \{ \langle End\_Point - Begin\_Point \rangle \times Through\_lanes \}_{section\ t}}$$

Where:

Good = total number of mainline highway Interstate System sections where the overall condition is Good;

$g$  = a section's overall condition is determined Good per paragraphs (b) or (c) of this section;

$t$  = an Interstate System section;

Total = total number of mainline highway Interstate System sections excluding bridges, unpaved surface and “other” surface types, and missing data sections, described in paragraph (f)(1) and (b)(4)(i) of this section.

Begin Point = Begin Milepost of each section  $g$  or  $t$ ;

End Point = End Milepost of each section  $g$  or  $t$ ; and

Through\_lanes = the number of lanes designated for through-traffic represented by a section  $g$  or  $t$ .

(3) For § 490.307(a)(2) the measure for percentage of lane-miles of the Interstate System in Poor condition shall be computed to the one tenth of a percent as follows:

$$100 \times \frac{\sum_{p=1}^{Poor} \{ \langle End\_Point - Begin\_Point \rangle \times Through\_lanes \}_{section\ p}}{\sum_{t=1}^{Total} \{ \langle End\_Point - Begin\_Point \rangle \times Through\_lanes \}_{section\ t}}$$

Where:

Poor = total number of mainline highway Interstate System sections where the overall condition is Poor;

$p$  = a section's overall condition is determined Poor per paragraphs (b) or (c) of this section;

$t$  = an Interstate System section;

Total = total number of mainline highway Interstate System sections excluding bridges, unpaved surface and “other” surface types, and missing data sections, described in paragraph (f)(1) and (b)(4)(i) of this section;

Begin Point = Begin Milepost of each section  $p$  or  $t$ ;

End Point = End Milepost of each section  $p$  or  $t$ ; and

Through\_lanes = the number of lanes designated for through-traffic represented by a section  $p$  or  $t$ .

(4) For § 490.307(a)(3) the measure for percentage of lane-miles of the non-Interstate NHS in Good condition in § 490.307(a)(3) shall be computed to the one tenth of a percent as follows:

$$100 \times \frac{\sum_{g=1}^{Good} \{ \langle End\_Point - Begin\_Point \rangle \times Through\_lanes \}_{section\ g}}{\sum_{t=1}^{Total} \{ \langle End\_Point - Begin\_Point \rangle \times Through\_lanes \}_{section\ t}}$$

Where:

Good = total number of mainline highway non-Interstate NHS sections where the overall condition is Good;

$g$  = a section's overall condition is determined Good per paragraphs (b), (c) or (d) of this section;

$t$  = a non-Interstate NHS section;

Total = total number of mainline highway non-Interstate NHS sections excluding bridges, unpaved surface and “other” surface types, and missing data sections, described in paragraph (f)(1) and (b)(4)(i) of this section;

Begin Point = Begin Milepost of each section  $g$  or  $t$ ;

End Point = End Milepost of each section  $g$  or  $t$ ; and

Through\_lanes = the number of lanes designated for through-traffic represented by a section  $g$  or  $t$ .

(5) For § 490.307(a)(4) the measure for percentage of lane-miles of the non-Interstate NHS in Poor condition in § 490.307(a)(4) shall be computed to the one tenth of a percent as follows:

$$100 \times \frac{\sum_{p=1}^{Poor} \{ \langle End\_Point - Begin\_Point \rangle \times Through\_lanes \}_{section\ p}}{\sum_{t=1}^{Total} \{ \langle End\_Point - Begin\_Point \rangle \times Through\_lanes \}_{section\ t}}$$

Where:

Poor = total number of mainline highway non-Interstate NHS sections where the overall condition is Poor;

$p$  = a section's overall condition is determined Poor per paragraphs (b), (c) or (d) of this section;



$t$  = a non-Interstate NHS section;  
Total = total number of mainline highway non-Interstate NHS sections excluding bridges, unpaved surface and “other” surface types, and missing data sections, described in paragraph (f)(1) and (b)(4)(i) of this section;  
Begin\_Point = Begin Milepost of each section  $p$  or  $t$ ;  
End Point = End Milepost of each section  $p$  or  $t$ ; and  
Through\_lanes = the number of lanes designated for through-traffic represented by a section  $p$  or  $t$ .

**§ 490.315 Establishment of minimum level for condition of pavements.**

(a) For the purposes of carrying out the requirements of 23 U.S.C. 119(f)(1), the percentage of lane-miles of Interstate System in Poor condition, as computed per § 490.313(e)(3), shall not exceed 5.0 percent except as noted in paragraph (b) of this section.

(b) For the purposes of carrying out the requirements of 23 U.S.C. 119(f)(1), the percentage of lane-miles of Interstate System in Poor condition within the State of Alaska, as computed per § 490.313(e)(3), shall not exceed 10.0 percent.

**§ 490.317 Penalties for not maintaining minimum Interstate System pavement condition.**

(a) The FHWA shall compute the Percentage of lane-miles of the Interstate System, excluding sections on bridges, in Poor Condition, in accordance with § 490.313(e)(3), for each State annually.

(b) Each year, FHWA shall extract data contained within the HPMS on June 15 that represents conditions from the prior calendar year for Interstate System pavement conditions to carry out paragraph (a) of this section, beginning with data collected during the 2018 calendar year.

(c) The FHWA shall determine if a State DOT is in compliance with § 490.315(a) or § 490.315(b) and 23 U.S.C. 119(f)(1) after the first full year of data collection for the Interstate System and each year thereafter.

(d) The FHWA will notify State DOTs of their compliance with 23 U.S.C. 119(f)(1) prior to October 1 of the year in which the determination was made.

(e) If FHWA determines through conduct of paragraph (d) of this section a State DOT to be out of compliance with 23 U.S.C. 119(f)(1) then the State DOT shall, during the following fiscal year:

(1) Obligate, from the amounts apportioned to the State DOT under 23 U.S.C. 104(b)(1) (for the NHPP), an amount that is not less than the amount of funds apportioned to the State for Federal fiscal year 2009 under the Interstate Maintenance program for the

purposes described in 23 U.S.C. 119 (as in effect on the day before the date of enactment of the MAP–21), except that for each year after Federal fiscal year 2013, the amount required to be obligated under this clause shall be increased by 2 percent over the amount required to be obligated in the previous fiscal year; and

(2) Transfer, from the amounts apportioned to the State DOT under 23 U.S.C. 104(b)(2) (for the Surface Transportation Program) (other than amounts sub-allocated to metropolitan areas and other areas of the State under 23 U.S.C. 133(d)) to the apportionment of the State under 23 U.S.C. 104(b)(1), an amount equal to 10 percent of the amount of funds apportioned to the State for fiscal year 2009 under the Interstate Maintenance program for the purposes described in 23 U.S.C. 119 (as in effect on the day before the date of enactment of the MAP–21).

**§ 490.319 Other requirements.**

(a) In accordance with the HPMS Field Manual (incorporated by reference, see § 490.111), each State DOT shall report the following to the HPMS no later than April 15 each year:

(1) The pavement condition metrics specified in § 490.311 that are necessary to calculate the Interstate System condition measures identified in §§ 490.307(a)(1) and (a)(2) and;

(2) The data elements specified in § 490.309(c) for the Interstate System

(b) In accordance with the HPMS Field Manual (incorporated by reference, see § 490.111), each State DOT shall report to the HPMS no later than June 15 each year the pavement condition metrics specified in § 490.311 that are necessary to calculate the non-Interstate NHS condition measures in §§ 490.307(a)(3) and (a)(4).

(c) Each State DOT shall develop and utilize a Data Quality Management Program, approved by FHWA that addresses the quality of all data collected, regardless of the method of acquisition, to report the pavement condition metrics, discussed in § 490.311, and data elements discussed in § 490.309(c).

(1) In a Data Quality Management Programs, State DOTs shall include, at a minimum, methods and processes for:

- (i) Data collection equipment calibration and certification;
- (ii) Certification process for persons performing manual data collection;
- (iii) Data quality control measures to be conducted before data collection begins and periodically during the data collection program;
- (iv) Data sampling, review and checking processes; and

(v) Error resolution procedures and data acceptance criteria.

(2) Not later than 1 year after the effective date of this regulation, State DOTs shall submit their Data Quality Management Program to FHWA for approval. Once FHWA approves a State DOT's Data Quality Management Program, the State DOT shall use that Program to collect and report data required by §§ 490.309 to 490.311. State DOTs also shall submit any proposed significant change to the Data Quality Management Program to FHWA for approval prior to implementing the change.

■ 4. Add subpart D to read as follows:

**Subpart D—National Performance Management Measures for Assessing Bridge Condition**

Sec.	Purpose.
490.401	Purpose.
490.403	Applicability.
490.405	Definitions.
490.407	National performance management measures for assessing bridge condition.
490.409	Calculation of National performance management measures for assessing bridge condition.
490.411	Establishment of minimum level for condition for bridges.
490.413	Penalties for not maintaining bridge condition.

**Subpart D—National Performance Management Measures for Assessing Bridge Condition**

**§ 490.401 Purpose.**

The purpose of this subpart is to implement the requirements of 23 U.S.C. 150(c)(3)(A)(ii)(III), which requires the Secretary of Transportation to establish performance measures for the purpose of carrying out the NHPP and for State DOTs and MPOs to use in assessing the condition of bridges carrying the NHS which includes on- and off-ramps connected to the NHS.

**§ 490.403 Applicability.**

The section is only applicable to bridges carrying the NHS, which includes on- and off-ramps connected to the NHS.

**§ 490.405 Definitions.**

The following definitions are only applicable to this subpart, unless otherwise provided:

*Structurally deficient* as used in §§ 490.411 and 490.413 is a classification given to a bridge which has any component in Poor or worse condition or the adequacy of the waterway opening provided by the bridge is determined to be insufficient to the point of causing overtopping with intolerable traffic interruptions. Beginning with calendar year 2018 and

thereafter, *structurally deficient* as used in §§ 490.411 and 490.413 is a classification given to a bridge which has any component in Poor or worse condition.

**§ 490.407 National performance management measures for assessing bridge condition.**

(a) There are three classifications for the purpose of assessing bridge condition. They are:

(1) Percentage of NHS bridges classified as in Good condition;

(2) Percentage of NHS bridges classified as in Fair condition; and

(3) Percentage of NHS bridges classified as in Poor condition.

(b) [Reserved]

(c) To carry out the NHPP, two of the three classifications are performance measures for State DOTs to use to assess bridge condition on the NHS. They are:

(1) Percentage of NHS bridges classified as in Good condition; and

(2) Percentage of NHS bridges classified as in Poor condition.

(d) Determination of Good and Poor conditions are described in § 490.409.

**§ 490.409 Calculation of National performance management measures for assessing bridge condition.**

(a) The bridge measures in § 490.407 shall be calculated in accordance with this section and used by State DOTs and MPOs to carry out the bridge condition related requirements of this part and by FHWA to make the significant progress determination specified in § 490.109.

(b) The condition of bridges carrying the NHS, which includes on- and off-ramps connected to the NHS, shall be classified as Good, Fair, or Poor following the criteria specified in this paragraph. The assignment of a classification of Good, Fair, or Poor shall be based on the bridge's condition ratings for NBI Items 58—Deck, 59—Superstructure, 60—Substructure, and 62—Culverts. For the purposes of national performance measures under the NHPP, the method of assessment to determine the classification of a bridge will be the minimum of condition rating method (*i.e.*, the condition ratings for lowest rating of a bridge's 3 NBI Items, 58—Deck, 59—Superstructure, and 60—Substructure). For culverts, the rating of its NBI Item, 62—Culverts, will determine its classification. The bridges carrying the NHS which includes on- and off-ramps connected to the NHS

will be classified as Good, Fair, or Poor based on the following criteria:

(1) *Good*: When the lowest rating of the 3 NBI items for a bridge (Items 58—Deck, 59—Superstructure, 60—Substructure) is 7, 8, or 9, the bridge will be classified as Good. When the rating of NBI item for a culvert (Item 62—Culverts) is 7, 8, or 9, the culvert will be classified as Good.

(2) *Fair*: When the lowest rating of the 3 NBI items for a bridge is 5 or 6, the bridge will be classified as Fair. When the rating of NBI item for a culvert is 5 or 6, the culvert will be classified as Fair.

(3) *Poor*: When the lowest rating of the 3 NBI items for a bridge is 4, 3, 2, 1, or 0, the bridge will be classified as Poor. When the rating of NBI item for a culvert is 4, 3, 2, 1, or 0, the culvert will be classified as Poor.

(c) The bridge measures specified in § 490.407(c) shall be calculated for the applicable bridges per paragraph (a) that pertain to each target established by the State DOT or MPO in §§ 490.105(e) and 490.105(f), respectively, as follows:

(1) For § 490.407(c)(1), the measure for the percentage of bridges classified as in Good condition shall be computed and reported to the one tenth of a percent as follows:

$$100 \times \frac{\sum_{g=1}^{\text{GOOD}} [\text{Length} \times \text{Width}]_{\text{Bridge } g}}{\sum_{s=1}^{\text{TOTAL}} [\text{Length} \times \text{Width}]_{\text{Bridge } s}}$$

Where:

GOOD = total number of the applicable bridges, where their condition is Good per paragraph (b)(1) of this section;

g = a bridge determined to be in Good condition per paragraph (b)(1) of this section;

Length = corresponding value of NBI Item 49—Structure Length for every applicable bridge;

Width = corresponding value of NBI Item

52—Deck Width or value of Item 32 Approach Roadway Width for culverts where the roadway is on a fill (*i.e.*, traffic does not directly run on the top slab (or wearing surface) of the culvert] and the headwalls do not affect the flow of traffic for every applicable bridge.

s = an applicable bridge per paragraph (b) of this section; and

TOTAL = total number of the applicable bridges specified in paragraph (b) of this section.

(2) For § 490.407(c)(2), the measure for the percentage of bridges classified as in Poor condition shall be computed and reported to the one tenth of a percent as follows:

$$100 \times \frac{\sum_{p=1}^{\text{POOR}} [\text{Length} \times \text{Width}]_{\text{Bridge } p}}{\sum_{s=1}^{\text{TOTAL}} [\text{Length} \times \text{Width}]_{\text{Bridge } s}}$$

Where:

POOR = total number of the applicable bridges, where their condition is Poor per paragraph (b)(3) of this section;

p = a bridge determined to be in Poor condition per paragraph (b)(3) of this section;

Length = corresponding value of NBI Item 49—Structure Length for every applicable bridge;

Width = corresponding value of NBI Item 52—Deck Width or value of Item 32 Approach Roadway Width for culverts

where the roadway is on a fill (*i.e.*, traffic does not directly run on the top slab (or wearing surface) of the culvert] and the headwalls do not affect the flow of traffic for every applicable bridge.

s = an applicable bridge per paragraph (b) of this section; and

TOTAL = total number of the applicable bridges specified in paragraph (b) of this section.

(d) The measures identified in § 490.407(c) shall be used to establish targets in accordance with § 490.105 and

report targets and conditions described in § 490.107.

(e) The NBI Items included in this section are found in the Recording and Coding Guide for the Structure Inventory and Appraisal of the Nation's Bridges, which is incorporated by reference (see § 490.111).

**§ 490.411 Establishment of minimum level for condition for bridges.**

(a) State DOTs will maintain bridges so that the percentage of the deck area of bridges classified as Structurally Deficient does not exceed 10.0 percent. This minimum condition level is applicable to bridges carrying the NHS, which includes on- and off-ramps connected to the NHS within a State, and bridges carrying the NHS that cross a State border.

(b) For the purposes of carrying out this section and § 490.413, a bridge will

be classified as Structurally Deficient when one of its NBI Items, 58—Deck, 59—Superstructure, 60—Substructure, or 62—Culverts, is 4 or less, or when one of its NBI Items, 67—Structural Evaluation or 71—Waterway Adequacy, is 2 or less. Beginning with calendar year 2018 and thereafter, a bridge will be classified as Structurally Deficient when one of its NBI Items, 58—Deck, 59—Superstructure, 60—Substructure, or 62—Culverts, is 4 or less.

(c) For all bridges carrying the NHS, which includes on- and off-ramps connected to the NHS and bridges carrying the NHS that cross a State border, FHWA shall calculate a ratio of the total deck area of all bridges classified as Structurally Deficient to the total deck area of all applicable bridges for each State. The percentage of deck area of bridges classified as Structurally Deficient shall be computed by FHWA to the one tenth of a percent as follows:

$$100 \times \frac{\sum_{SD=1}^{\text{Structurally Deficient}} [\text{Length} \times \text{Width}]_{\text{Bridge SD}}}{\sum_{s=1}^{\text{TOTAL}} [\text{Length} \times \text{Width}]_{\text{Bridge s}}}$$

Where:

Structurally Deficient = total number of the applicable bridges, where their classification is Structurally Deficient per this section and § 490.413;

SD = a bridge classified as Structurally Deficient per this section and § 490.413;

Length = corresponding value of NBI Item 49—Structure Length for every applicable bridge;

Width = corresponding value of NBI Item 52—Deck Width

Beginning with calendar year 2018 and thereafter, Width = corresponding value of NBI Item 52—Deck Width or value of Item 32 Approach Roadway Width for culverts where the roadway is on a fill [i.e., traffic does not directly run on the top slab (or wearing surface) of the culvert] and the headwalls do not affect the flow of traffic for every applicable bridge.

s = an applicable bridge per this section and § 490.413; and

TOTAL = total number of the applicable bridges specified in this section and § 490.413.

(d) The FHWA will annually determine the percentage of the deck area of NHS bridges classified as Structurally Deficient for each State DOT and identify State DOTs that do not meet the minimum level of condition for NHS bridges based on data cleared in the NBI as of June 15 of each year. The FHWA will notify State DOTs of their compliance with 23 U.S.C. 119(f)(2) prior to October 1 of the year in which the determination was made.

(e) For the purposes of carrying out this section, State DOTs will annually submit their most current NBI data on highway bridges to FHWA no later than March 15 of each year.

(f) The NBI Items included in this section are found in the Recording and Coding Guide for the Structure Inventory and Appraisal of the Nation's Bridges, which is incorporated by reference (see § 490.111).

**§ 490.413 Penalties for not maintaining bridge condition.**

(a) If FHWA determines for the 3-year period preceding the date of the determination, that more than 10.0 percent of the total deck area of bridges in the State on the NHS is located on bridges that have been classified as Structurally Deficient, the following requirements will apply.

(1) During the fiscal year following the determination, the State DOT shall obligate and set aside in an amount equal to 50 percent of funds apportioned to such State for fiscal year 2009 to carry out 23 U.S.C. 144 (as in effect the day before enactment of MAP-21) from amounts apportioned to a State for a fiscal year under 23 U.S.C. 104(b)(1) only for eligible projects on bridges on the NHS.

(2) The set-aside and obligation requirement for bridges on the NHS in a State in paragraph (a) of this section for a fiscal year shall remain in effect for each subsequent fiscal year until such time as less than 10 percent of the total deck area of bridges in the State on the NHS is located on bridges that have been classified as Structurally Deficient as determined by FHWA.

(b) The FHWA will make the first determination by October 1, 2016, and each fiscal year thereafter.

[FR Doc. 2017-00550 Filed 1-12-17; 4:15 pm]

**BILLING CODE 4910-22-P**

**DEPARTMENT OF TRANSPORTATION**

**Federal Highway Administration**

**23 CFR Part 490**

[Docket No. FHWA-2013-0054]

**RIN 2125-AF54**

**National Performance Management Measures; Assessing Performance of the National Highway System, Freight Movement on the Interstate System, and Congestion Mitigation and Air Quality Improvement Program**

**AGENCY:** Federal Highway Administration (FHWA), Department of Transportation (DOT).

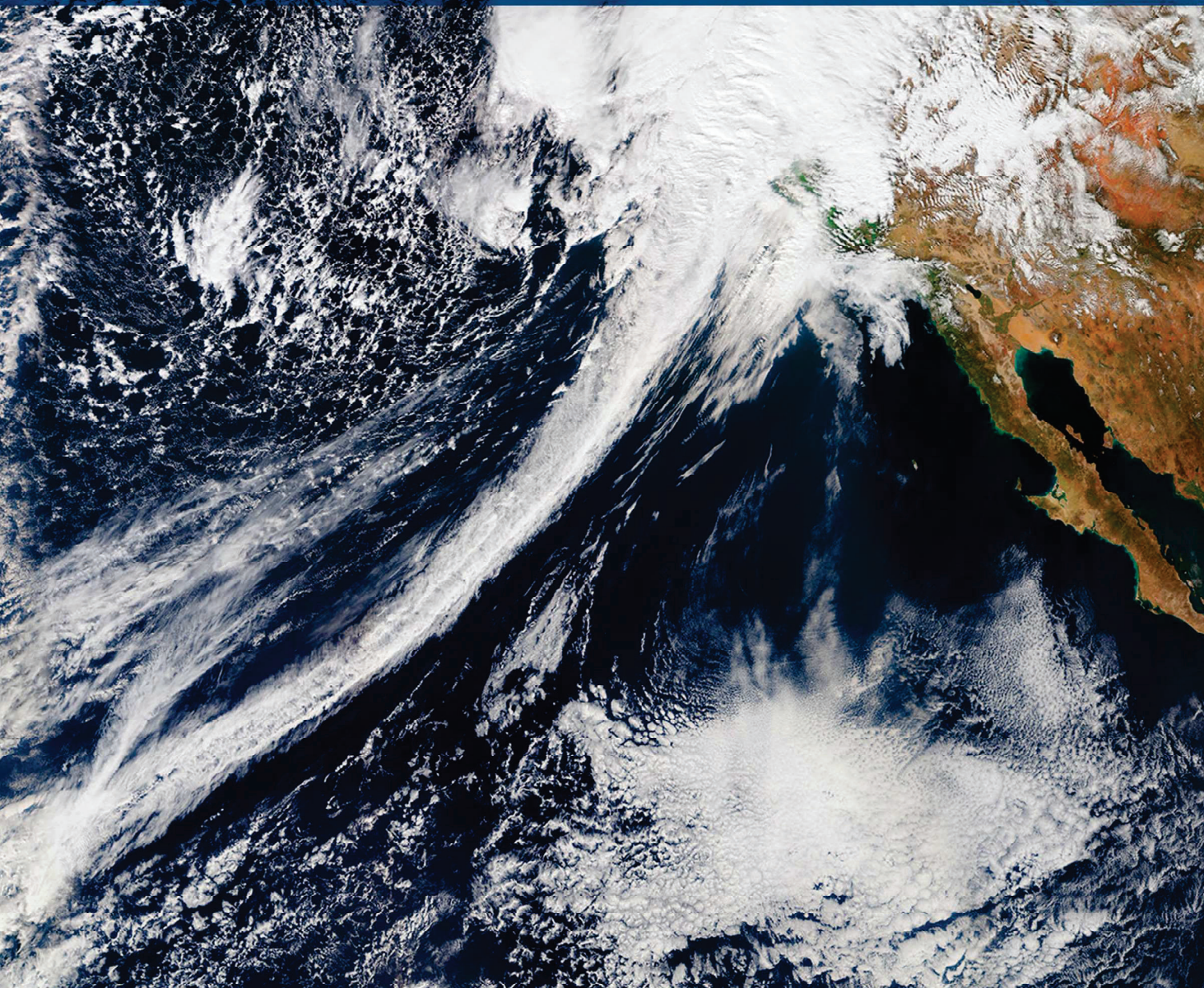
**ACTION:** Final rule.

**SUMMARY:** This final rule is the third and last in a series of three related rulemakings that together establishes a set of performance measures for State departments of transportation (State DOT) and Metropolitan Planning Organizations (MPO) to use as required by the Moving Ahead for Progress in the 21st Century Act (MAP-21) and the Fixing America's Surface Transportation (FAST) Act. The measures in this third final rule will be used by State DOTs and MPOs to assess the performance of the Interstate and non-Interstate National Highway System (NHS) for the purpose of carrying out the National Highway Performance Program (NHPP); to assess freight movement on the Interstate System; and to assess traffic congestion and on-road mobile source emissions for the purpose of carrying out the Congestion Mitigation and Air Quality Improvement (CMAQ) Program. This third performance measure final rule also includes a discussion that summarizes all three of the national performance management measures





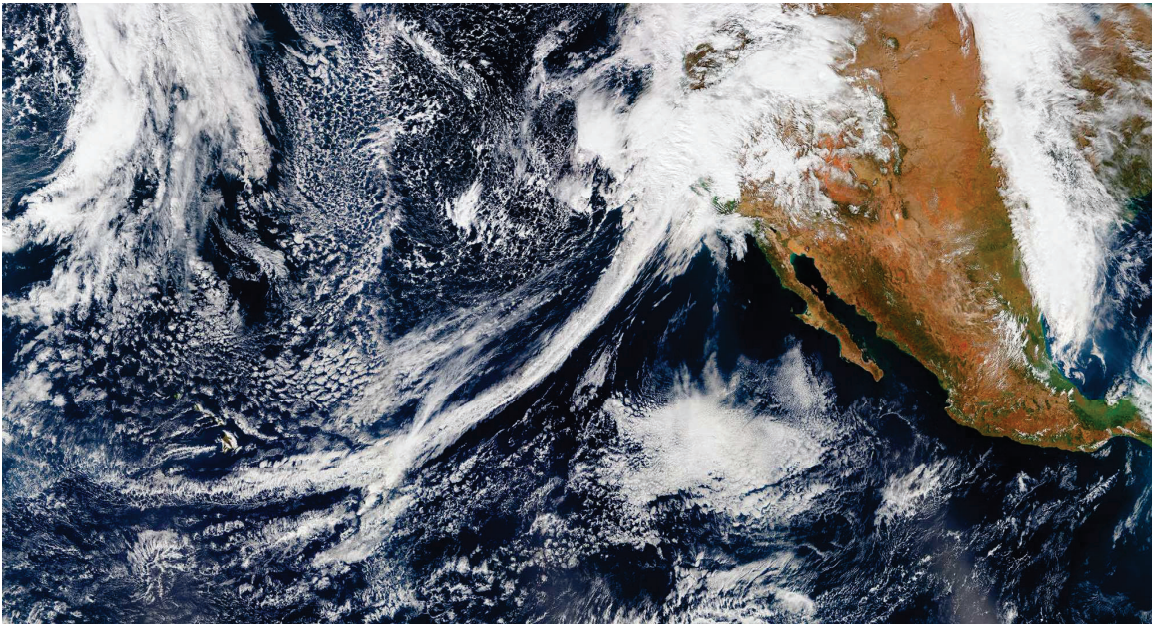
# CLIMATE SCIENCE SPECIAL REPORT



Fourth National Climate Assessment | Volume I



# CLIMATE SCIENCE SPECIAL REPORT



Fourth National Climate Assessment | Volume I



U.S. Global Change  
Research Program

Available on-line at: <[science2017.globalchange.gov](http://science2017.globalchange.gov)>

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USGCRP, 2017: *Climate Science Special Report: Fourth National Climate Assessment, Volume I* [Wuebbles, D.J., D.W. Fahey, K.A. Hibbard, D.J. Dokken, B.C. Stewart, and T.K. Maycock (eds.)]. U.S. Global Change Research Program, Washington, DC, USA, 470 pp., doi: 10.7930/J0J964J6.

#### **Image Credit**

**Front Cover:** Atmospheric rivers are relatively long, narrow regions in the atmosphere – like rivers in the sky – that transport most of the water vapor outside of the tropics. When an atmospheric river makes landfall, extreme precipitation and flooding can often result. The cover features a natural-color image of conditions over the northeastern Pacific on 20 February 2017, helping California and the American West emerge from a 5-year drought in stunning fashion. Some parts of California received nearly twice as much rain in a single deluge as normally falls in the preceding 5 months (October–February). The visualization was generated by Jesse Allen (NASA Earth Observatory) using data from the Visible Infrared Imaging Radiometer Suite (VIIRS) on the Suomi National Polar-orbiting Partnership (NPP) satellite.

**Chapter Banners:** Special thanks to the NASA Earth Observatory team for the non-captioned data products incorporated into chapter titles and web banners throughout the Climate Science Special Report.



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**U.S. GLOBAL CHANGE RESEARCH PROGRAM**  
**CLIMATE SCIENCE SPECIAL REPORT (CSSR)**

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## About This Report



As a key part of the Fourth National Climate Assessment (NCA4), the U.S. Global Change Research Program (USGCRP) oversaw the production of this stand-alone report of the state of science relating to climate change and its physical impacts.

The Climate Science Special Report (CSSR) is designed to be an authoritative assessment of the science of climate change, with a focus on the United States, to serve as the foundation for efforts to assess climate-related risks and inform decision-making about responses. In accordance with this purpose, it does not include an assessment of literature on climate change mitigation, adaptation, economic valuation, or societal responses, nor does it include policy recommendations.

As Volume I of NCA4, CSSR serves several purposes, including providing 1) an updated detailed analysis of the findings of how climate change is affecting weather and climate across the United States; 2) an executive summary and other CSSR materials that provide the basis for the discussion of climate science found in the second volume of the NCA4; and 3) foundational information and projections for climate change, including extremes, to improve “end-to-end” consistency in sectoral, regional, and resilience analyses within the second volume. CSSR integrates and evaluates the findings on climate science and discusses the uncertainties associated with these findings. It analyzes current trends in climate change, both human-induced and natural, and projects major trends to the end of this century. As an assessment and analysis of the science, this report provides important input to the development of other parts of NCA4, and their primary focus on the human welfare, societal, economic, and environmental elements of climate change.

Much of this report is written at a level more appropriate for a scientific audience, though the Executive Summary is intended to be accessible to a broader audience.

### Report Development, Review, and Approval Process

The National Oceanic and Atmospheric Administration (NOAA) serves as the administrative lead agency for the preparation of NCA4. The CSSR Federal Science Steering Committee (SSC)<sup>1</sup> has representatives from three agencies (NOAA, the National Aeronautics and Space Administration [NASA], and the Department of Energy [DOE]); USGCRP;<sup>2</sup> and three Coordinating Lead Authors, all of whom were Federal employees during the development of this report. Following a public notice for author nominations in March 2016, the SSC selected the writing team, consisting of scientists representing Federal agencies, national laboratories, universities, and the private sector. Contributing Authors were requested to provide special input to the Lead Authors to help with specific issues of the assessment.

The first Lead Author Meeting was held in Washington, DC, in April 2016, to refine the outline contained in the SSC-endorsed prospectus and to make writing assignments. Over the course of 18 months before final

<sup>1</sup> The CSSR SSC was charged with overseeing the development and production of the report. SSC membership was open to all USGCRP agencies.

<sup>2</sup> The USGCRP is made up of 13 Federal departments and agencies that carry out research and support the Nation's response to global change. The USGCRP is overseen by the Subcommittee on Global Change Research (SGCR) of the National Science and Technology Council's Committee on Environment, Natural Resources, and Sustainability (CENRS), which in turn is overseen by the White House Office of Science and Technology Policy (OSTP). The agencies within USGCRP are the Department of Agriculture, the Department of Commerce (NOAA), the Department of Defense, the Department of Energy, the Department of Health and Human Services, the Department of the Interior, the Department of State, the Department of Transportation, the Environmental Protection Agency, the National Aeronautics and Space Administration, the National Science Foundation, the Smithsonian Institution, and the U.S. Agency for International Development.

publication, seven CSSR drafts were generated, with each successive iteration—from zero- to sixth-order drafts—undergoing additional expert review, as follows: (i) by the writing team itself (13–20 June 2016); (ii) by the SSC convened to oversee report development (29 July–18 August 2016); (iii) by the technical agency representatives (and designees) comprising the Subcommittee on Global Change Research (SGCR, 3–14 October 2016); (iv) by the SSC and technical liaisons again (5–13 December 2016); (v) by the general public during the Public Comment Period (15 December 2016–3 February 2017) and an expert panel convened by the National Academies of Sciences, Engineering, and Medicine (NAS, 21 December 2016–13 March 2017);<sup>3</sup> and (vi) by the SGCR again (3–24 May 2017) to confirm the Review Editor conclusions that all public and NAS comments were adequately addressed. In October 2016, an 11-member core writing team was tasked with capturing the most important CSSR key findings and generating an Executive Summary. Two additional Lead Authors Meetings were held after major review milestones to facilitate chapter team deliberations and consistency: 2–4 November 2016 (Boulder, CO) and 21–22 April 2017 (Asheville, NC). Literature cutoff dates were enforced, with all cited material published by June 2017. The fifth-order draft including the Executive Summary was compiled in June 2017, and submitted to the Office of Science and Technology Policy (OSTP). OSTP is responsible for the Federal clearance process prior to final report production and public release. This published report represents the final (sixth-order) draft.

<sup>3</sup> Author responses to comments submitted as part of the Public Comment Period and a USGCRP response to the review conducted by NAS can be found on <[science2017.globalchange.gov/downloads](https://science2017.globalchange.gov/downloads)>.

## The Sustained National Climate Assessment



The Climate Science Special Report has been developed as part of the USGCRP's sustained National Climate Assessment (NCA) process. This process facilitates continuous and transparent participation of scientists and stakeholders across regions and sectors, enabling new information and insights to be assessed as they emerge. The Climate Science Special Report is aimed at a comprehensive assessment of the science underlying the changes occurring in Earth's climate system, with a special focus on the United States.

## Sources Used in this Report

The findings in this report are based on a large body of scientific, peer-reviewed research, as well as a number of other publicly available sources, including well-established and carefully evaluated observational and modeling datasets. The team of authors carefully reviewed these sources to ensure a reliable assessment of the state of scientific understanding. Each source of information was determined to meet the four parts of the quality assurance guidance provided to authors (following the approach from NCA3): 1) utility, 2) transparency and traceability, 3) objectivity, and 4) integrity and security. Report authors assessed and synthesized information from peer-reviewed journal articles, technical reports produced by Federal agencies, scientific assessments (such as the rigorously-reviewed international assessments from the Intergovernmental Panel on Climate Change,<sup>1</sup> reports of the National Academy of Sciences and its associated National Research Council, and various regional climate impact assessments, conference proceedings, and government statistics (such as population census and energy usage).

## Guide to the Report



The following subsections describe the format of the Climate Science Special Report and the overall structure and features of the chapters.

### Executive Summary

The Executive Summary describes the major findings from the Climate Science Special Report. It summarizes the overall findings and includes some key figures and additional bullet points covering overarching and especially noteworthy conclusions. The Executive Summary and the majority of the Key Findings are written to be accessible to a wide range of audiences.

### Chapters

#### Key Findings and Traceable Accounts

Each topical chapter includes Key Findings, which are based on the authors' expert judgment of the synthesis of the assessed literature. Each Key Finding includes a confidence statement and, as appropriate, framing of key scientific uncertainties, so as to better support assessment of climate-related risks. (See "Documenting Uncertainty" below).

Each Key Finding is also accompanied by a Traceable Account that documents the supporting evidence, process, and rationale the authors used in reaching these conclusions and provides additional information on sources of uncertainty through confidence and likelihood statements. The Traceable Accounts can be found at the end of each chapter.

#### Regional Analyses

Throughout the report, the regional analyses of climate changes for the United States are structured on 10 different regions as shown in Figure 1. There are differences from the regions used in the Third National Climate Assessment<sup>2</sup>: 1) the Great Plains are split into

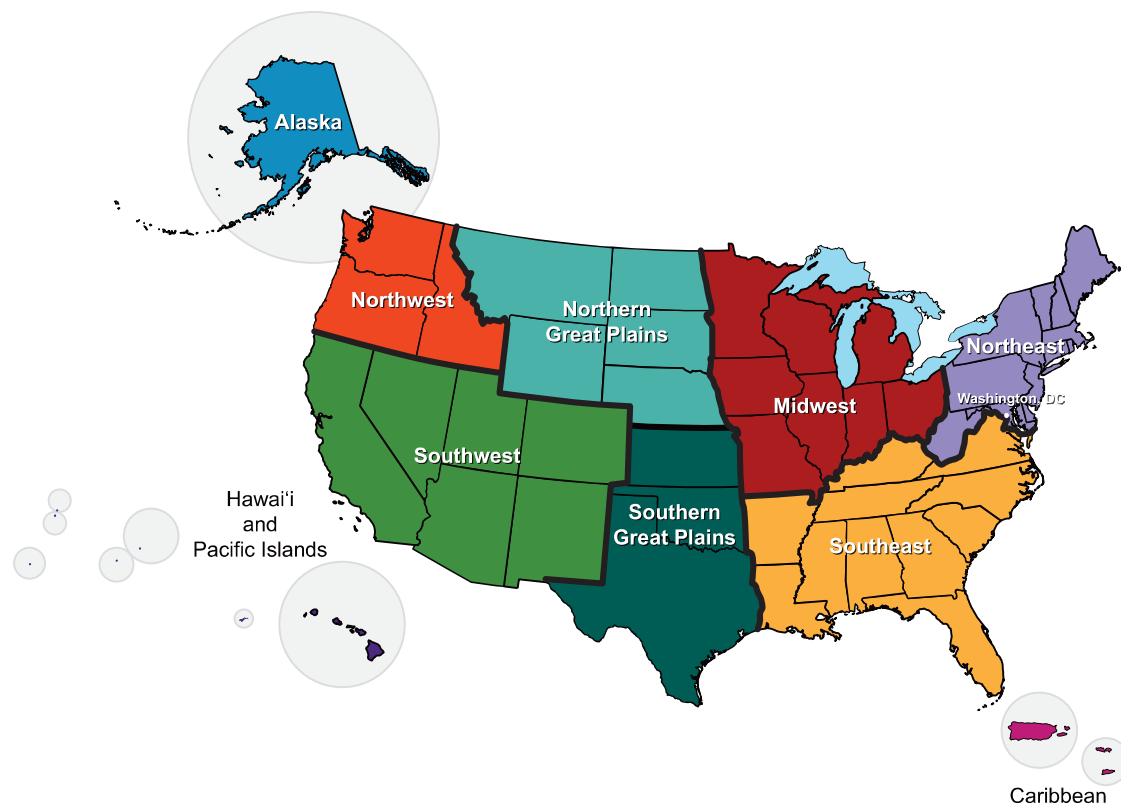
the Northern Great Plains and Southern Great Plains; and 2) The U.S. islands in the Caribbean are analyzed as a separate region apart from the Southeast.

#### Chapter Text

Each chapter assesses the state of the science for a particular aspect of the changing climate. The first chapter gives a summary of the global changes occurring in the Earth's climate system. This is followed in Chapter 2 by a summary of the scientific basis for climate change. Chapter 3 gives an overview of the processes used in the detection and attribution of climate change and associated studies using those techniques. Chapter 4 then discusses the scenarios for greenhouse gases and particles and the modeling tools used to study future projections. Chapters 5 through 9 primarily focus on physical changes in climate occurring in the United States, including those projected to occur in the future. Chapter 10 provides a focus on land use change and associated feedbacks on climate. Chapter 11 addresses changes in Alaska in the Arctic, and how the latter affects the United States. Chapters 12 and 13 discuss key issues connected with sea level rise and ocean changes, including ocean acidification, and their potential effects on the United States. Finally, Chapters 14 and 15 discuss some important perspectives on how mitigation activities could affect future changes in climate and provide perspectives on what surprises could be in store for the changing climate beyond the analyses already covered in the rest of the assessment.

Throughout the report, results are presented in United States customary units (e.g., degrees Fahrenheit) as well as in the International System of Units (e.g., degrees Celsius).





**Figure 1.** Map of the ten regions of the United States used throughout the Climate Science Special Report. Regions are similar to that used in the Third National Climate Assessment except that 1) the Great Plains are split into the Northern Great Plains and Southern Great Plains, and 2) the Caribbean islands have been split from the Southeast region. (Figure source: adapted from Melillo et al. 2014<sup>2</sup>).

### Reference Time Periods for Graphics

There are many different types of graphics in the Climate Science Special Report. Some of the graphs in this report illustrate historical changes and future trends in climate compared to some reference period, with the choice of this period determined by the purpose of the graph and the availability of data. The scientific community does not have a standard set of reference time periods for assessing the science, and these tend to be chosen differently for different reports and assessments. Some graphics are pulled from other studies using different time periods.

Where graphs were generated for this report (those not based largely on prior publications), they are mostly based on one of two reference

periods. The 1901–1960 reference period is particularly used for graphs that illustrate past changes in climate conditions, whether in observations or in model simulations. This 60-year time period was also used for analyses in the Third National Climate Assessment (NCA3<sup>2</sup>). The beginning date was chosen because earlier historical observations are generally considered to be less reliable. While a 30-year base period is often used for climate analyses, the choice of 1960 as the ending date of this period was based on past changes in human influences on the climate system. Human-induced forcing exhibited a slow rise during the early part of the last century but then accelerated after 1960. Thus, these graphs highlight observed changes in climate during the period of rapid increase in human-caused

forcing and also reveal how well climate models simulate these observed changes.

Thus, a number of the graphs in the report are able to highlight the recent, more rapid changes relative to the early part of the century (the reference period) and also reveal how well the climate models simulate observed changes. In this report, this time period is used as the base period in most maps of observed trends and all time-varying, area-weighted averages that show both observed and projected quantities. For the observed trends, 1986–2015 is generally chosen as the most recent 30-year period (2016 data was not fully available until late in our development of the assessment).

The other commonly used reference period in this report is 1976–2005. The choice of a 30-year period is chosen to account for natural variations and to have a reasonable sampling in order to estimate likelihoods of trends in extremes. This period is consistent with the World Meteorological Organization’s recommendation for climate statistics. This period is used for graphs that illustrate projected changes simulated by climate models. The purpose of these graphs is to show projected changes compared to a period that allows stakeholders and decision makers to base fundamental planning and decisions on average and extreme climate conditions in a non-stationary climate; thus, a recent available 30-year period was chosen.<sup>3</sup> The year 2005 was chosen as an end date because the historical period simulated by the models used in this assessment ends in that year.

For future projections, 30-year periods are again used for consistency. Projections are centered around 2030, 2050, and 2085 with an interval of plus and minus 15 years (for example, results for 2030 cover the period 2015–2045); Most model runs used here only project out to 2100 for future scenarios, but where

possible, results beyond 2100 are shown. Note that these time periods are different than those used in some of the graphics in NCA3. There are also exceptions for graphics that are based on existing publications.

For global results that may be dependent on findings from other assessments (such as those produced by the Intergovernmental Panel on Climate Change, or IPCC), and for other graphics that depend on specific published work, the use of other time periods was also allowed, but an attempt was made to keep them as similar to the selected periods as possible. For example, in the discussion of radiative forcing, the report uses the standard analyses from IPCC for the industrial era (1750 to 2011) (following IPCC 2013a<sup>1</sup>). And, of course, the paleoclimatic discussion of past climates goes back much further in time.

#### **Model Results: Past Trends and Projected Futures**

The NCA3 included global modeling results from both the CMIP3 (Coupled Model Intercomparison Project, 3rd phase) models used in the 2007 international assessment<sup>4</sup> and the CMIP5 (Coupled Model Intercomparison Project, Phase 5) models used in the more recent international assessment.<sup>1</sup> Here, the primary resource for this assessment is the more recent global model results and associated downscaled products from CMIP5. The CMIP5 models and the associated downscaled products are discussed in Chapter 4: Projections.

#### **Treatment of Uncertainties: Likelihoods, Confidence, and Risk Framing**

Throughout this report’s assessment of the scientific understanding of climate change, the authors have assessed to the fullest extent possible the state-of-the-art understanding of the science resulting from the information in the scientific literature to arrive at a series of findings referred to as Key Findings. The approach used to represent the extent of un-



derstanding represented in the Key Findings is done through two metrics:

- **Confidence** in the validity of a finding based on the type, amount, quality, strength, and consistency of evidence (such as mechanistic understanding, theory, data, models, and expert judgment); the skill, range, and consistency of model projections; and the degree of agreement within the body of literature.
- **Likelihood**, or probability of an effect or impact occurring, is based on measures of uncertainty expressed probabilistically (based on the degree of understanding or knowledge, e.g., resulting from evaluating statistical analyses of observations or model results or on expert judgment).

The terminology used in the report associated with these metrics is shown in Figure 2. This language is based on that used in NCA3,<sup>2</sup> the IPCC's Fifth Assessment Report,<sup>1</sup> and most recently the USGCRP Climate and Health assessment.<sup>5</sup> Wherever used, the confidence and likelihood statements are italicized.

Assessments of confidence in the Key Findings are based on the expert judgment of the author team. Authors provide supporting evidence for each of the chapter's Key Findings in the Traceable Accounts. Confidence is expressed qualitatively and ranges from low confidence (inconclusive evidence or disagreement among experts) to very high confidence (strong evidence and high consensus) (see Figure 2). Confidence should not be interpreted probabilistically, as it is distinct from statistical likelihood. See chapter 1 in IPCC<sup>1</sup> for further discussion of this terminology.

In this report, likelihood is the chance of occurrence of an effect or impact based on measures of uncertainty expressed probabilis-

tically (based on statistical analysis of observations or model results or on expert judgment). The authors used expert judgment based on the synthesis of the literature assessed to arrive at an estimation of the likelihood that a particular observed effect was related to human contributions to climate change or that a particular impact will occur within the range of possible outcomes. Model uncertainty is an important contributor to uncertainty in climate projections, and includes, but is not restricted to, the uncertainties introduced by errors in the model's representation of the physical and bio-geochemical processes affecting the climate system as well as in the model's response to external forcing.<sup>1</sup>

Where it is considered justified to report the likelihood of particular impacts within the range of possible outcomes, this report takes a plain-language approach to expressing the expert judgment of the chapter team, based on the best available evidence. For example, an outcome termed "likely" has at least a 66% chance of occurring (a likelihood greater than about 2 of 3 chances); an outcome termed "very likely," at least a 90% chance (more than 9 out of 10 chances). See Figure 2 for a complete list of the likelihood terminology used in this report.

#### Traceable Accounts for each Key Finding

1) document the process and rationale the authors used in reaching the conclusions in their Key Finding, 2) provide additional information to readers about the quality of the information used, 3) allow traceability to resources and data, and 4) describe the level of likelihood and confidence in the Key Finding. Thus, the Traceable Accounts represent a synthesis of the chapter author team's judgment of the validity of findings, as determined through evaluation of evidence and agreement in the scientific literature. The Traceable Accounts also identify areas where data are





Confidence Level	Likelihood
<b>Very High</b>	<b>Virtually Certain</b>
Strong evidence (established theory, multiple sources, consistent results, well documented and accepted methods, etc.), high consensus	99%–100%
<b>High</b>	<b>Extremely Likely</b>
Moderate evidence (several sources, some consistency, methods vary and/or documentation limited, etc.), medium consensus	95%–100%
<b>Medium</b>	<b>Very Likely</b>
Suggestive evidence (a few sources, limited consistency, models incomplete, methods emerging, etc.), competing schools of thought	90%–100%
<b>Low</b>	<b>Likely</b>
Inconclusive evidence (limited sources, extrapolations, inconsistent findings, poor documentation and/or methods not tested, etc.), disagreement or lack of opinions among experts	66%–100%
	<b>About as Likely as Not</b>
	33%–66%
	<b>Unlikely</b>
	0%–33%
	<b>Very Unlikely</b>
	0%–10%
	<b>Extremely Unlikely</b>
	0%–5%
	<b>Exceptionally Unlikely</b>
	0%–1%



**Figure 2.** Confidence levels and likelihood statements used in the report. (Figure source: adapted from USGCRP 2016<sup>5</sup> and IPCC 2013<sup>1</sup>; likelihoods use the broader range from the IPCC assessment). As an example, regarding “likely,” a 66%–100% probability can be interpreted as a likelihood of greater than 2 out of 3 chances for the statement to be certain or true. Not all likelihoods are used in the report.

limited or emerging. Each Traceable Account includes 1) a description of the evidence base, 2) major uncertainties, and 3) an assessment of confidence based on evidence.

All Key Findings include a description of confidence. Where it is considered scientifically justified to report the likelihood of particular impacts within the range of possible outcomes, Key Findings also include a likelihood designation.

Confidence and likelihood levels are based on the expert judgment of the author team. They determined the appropriate level of confidence or likelihood by assessing the available literature, determining the quality and quantity of available evidence, and evaluating the level of agreement across different studies. Often, the underlying studies provided their own estimates of uncertainty and confidence intervals. When available, these confidence intervals were assessed by the authors in

making their own expert judgments. For specific descriptions of the process by which the author team came to agreement on the Key Findings and the assessment of confidence and likelihood, see the Traceable Accounts in each chapter.

In addition to the use of systematic language to convey confidence and likelihood information, this report attempts to highlight aspects of the science that are most relevant for supporting other parts of the Fourth National Climate Assessment and its analyses of key societal risks posed by climate change. This includes attention to trends and changes in the tails of the probability distribution of future climate change and its proximate impacts (for example, on sea level or temperature and precipitation extremes) and on defining plausible bounds for the magnitude of future changes, since many key risks are disproportionately determined by plausible low-probability, high-consequence outcomes. Therefore, in addition to presenting the expert judgment on the “most likely” range of projected future climate outcomes, where appropriate, this report also provides information on the outcomes

lying outside this range, which nevertheless cannot be ruled out and may therefore be relevant for assessing overall risk. In some cases, this involves an evaluation of the full range of information contained in the ensemble of climate models used for this report, and in other cases this involves the consideration of additional lines of scientific evidence beyond the models.

Complementing this use of risk-focused language and presentation around specific scientific findings in the report, Chapter 15: Potential Surprises provides an overview of potential low probability / high consequence “surprises” resulting from climate change. This includes its analyses of thresholds, also called tipping points, in the climate system and the compounding effects of multiple, interacting climate change impacts whose consequences may be much greater than the sum of the individual impacts. Chapter 15 also highlights critical knowledge gaps that determine the degree to which such high-risk tails and bounding scenarios can be precisely defined, including missing processes and feedbacks.



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## Highlights of the U.S. Global Change Research Program

### Climate Science Special Report

The climate of the United States is strongly connected to the changing global climate. The statements below highlight past, current, and projected climate changes for the United States and the globe.

Global annually averaged surface air temperature has increased by about 1.8°F (1.0°C) over the last 115 years (1901–2016). **This period is now the warmest in the history of modern civilization.** The last few years have also seen record-breaking, climate-related weather extremes, and the last three years have been the warmest years on record for the globe. These trends are expected to continue over climate timescales.

This assessment concludes, based on extensive evidence, that it is extremely likely that **human activities, especially emissions of greenhouse gases, are the dominant cause of the observed warming since the mid-20th century.** For the warming over the last century, there is no convincing alternative explanation supported by the extent of the observational evidence.

In addition to warming, many other aspects of global climate are changing, primarily in response to human activities. **Thousands of studies conducted by researchers around the world have documented changes in surface, atmospheric, and oceanic temperatures; melting glaciers; diminishing snow cover; shrinking sea ice; rising sea levels; ocean acidification; and increasing atmospheric water vapor.**

For example, **global average sea level has risen by about 7–8 inches** since 1900, with almost half (about 3 inches) of that rise occurring since 1993. Human-caused climate change has made a substantial contribution to this rise since 1900, contributing to a rate of rise that is greater than during any preceding century in at least 2,800 years. Global sea level rise has already affected the United States; **the incidence of daily tidal flooding is accelerating in more than 25 Atlantic and Gulf Coast cities.**

**Global average sea levels are expected to continue to rise—by at least several inches in the next 15 years and by 1–4 feet by 2100. A rise of as much as 8 feet by 2100 cannot be ruled out.** Sea level rise will be higher than the global average on the East and Gulf Coasts of the United States.

Changes in the characteristics of extreme events are particularly important for human safety, infrastructure, agriculture, water quality and quantity, and natural ecosystems. **Heavy rainfall is increasing in intensity and frequency across the United States and globally and is expected to continue to increase.** The largest observed changes in the United States have occurred in the Northeast.

**Heatwaves have become more frequent in the United States since the 1960s, while extreme cold temperatures and cold waves are less frequent.** Recent record-setting hot years are projected to become common in the near future for the United States, as annual average temperatures continue to rise. Annual average temperature over the contiguous United States has increased by 1.8°F (1.0°C) for the period 1901–2016; **over the next few decades (2021–2050), annual average temperatures are expected to rise by about 2.5°F for the United States, relative to the recent past (average from 1976–2005), under all plausible future climate scenarios.**

**The incidence of large forest fires in the western United States and Alaska has increased since the early 1980s and is projected to further increase** in those regions as the climate changes, with profound changes to regional ecosystems.

**Annual trends toward earlier spring melt and reduced snowpack are already affecting water resources in the western United States** and these trends are expected to continue. Under higher scenarios, and assuming no change to current water resources management, **chronic, long-duration hydrological drought is increasingly possible before the end of this century.**

**The magnitude of climate change beyond the next few decades will depend primarily on the amount of greenhouse gases (especially carbon dioxide) emitted globally.** Without major reductions in emissions, the increase in annual average global temperature relative to preindustrial times could reach 9°F (5°C) or more by the end of this century. **With significant reductions in emissions, the increase in annual average global temperature could be limited to 3.6°F (2°C) or less.**

**The global atmospheric carbon dioxide (CO<sub>2</sub>) concentration has now passed 400 parts per million (ppm), a level that last occurred about 3 million years ago, when both global average temperature and sea level were significantly higher than today.** Continued growth in CO<sub>2</sub> emissions over this century and beyond would lead to an atmospheric concentration not experienced in tens to hundreds of millions of years. There is broad consensus that the further and the faster the Earth system is pushed towards warming, the greater the risk of unanticipated changes and impacts, some of which are potentially large and irreversible.

The observed increase in carbon emissions over the past 15–20 years has been consistent with higher emissions pathways. **In 2014 and 2015, emission growth rates slowed as economic growth became less carbon-intensive.** Even if this slowing trend continues, however, it is not yet at a rate that would limit global average temperature change to well below 3.6°F (2°C) above preindustrial levels.

#### **Recommended Citation for Chapter**

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# Executive Summary

## Introduction

New observations and new research have increased our understanding of past, current, and future climate change since the Third U.S. National Climate Assessment (NCA3) was published in May 2014. This Climate Science Special Report (CSSR) is designed to capture that new information and build on the existing body of science in order to summarize the current state of knowledge and provide the scientific foundation for the Fourth National Climate Assessment (NCA4).

Since NCA3, stronger evidence has emerged for continuing, rapid, human-caused warming of the global atmosphere and ocean. This report concludes that “it is *extremely likely* that human influence has been the dominant cause of the observed warming since the mid-20th century. For the warming over the last century, there is no convincing alternative explanation supported by the extent of the observational evidence.”

The last few years have also seen record-breaking, climate-related weather extremes, the three warmest years on record for the globe, and continued decline in arctic sea ice. These trends are expected to continue in the future over climate (multidecadal) timescales. Significant advances have also been made in our understanding of extreme weather events and how they relate to increasing global temperatures and associated climate changes. Since 1980, the cost of extreme events for the United States has exceeded \$1.1 trillion; therefore, better understanding of the frequency and severity of these events in the context of a changing climate is warranted.

Periodically taking stock of the current state of knowledge about climate change and putting new weather extremes, changes in sea ice, increases in ocean temperatures, and ocean acidification into context ensures that rigorous, scientifically-based information is available to inform dialogue and decisions at every level. This climate science report serves as the climate science foundation of the NCA4 and is generally intended for those who have a technical background in climate science. In this Executive Summary, gray boxes present highlights of the main report. These are followed by related points and selected figures providing more scientific details. The summary material on each topic presents the most salient points of chapter findings and therefore represents only a subset of the report’s content. For more details, the reader is referred to the individual chapters. This report discusses climate trends and findings at several scales: global, nationwide for the United States, and for ten specific U.S. regions (shown in Figure 1 in the Guide to the Report). A statement of scientific confidence also follows each point in the Executive Summary. The confidence scale is described in the Guide to the Report. At the end of the Executive Summary and in Chapter 1: Our Globally Changing Climate, there is also a summary box highlighting the most notable advances and topics since NCA3 and since the 2013 Intergovernmental Panel on Climate Change (IPCC) Fifth Assessment Report.



## Global and U.S. Temperatures Continue to Rise

Long-term temperature observations are among the most consistent and widespread evidence of a warming planet. Temperature (and, above all, its local averages and extremes) affects agricultural productivity, energy use, human health, water resources, infrastructure, natural ecosystems, and many other essential aspects of society and the natural environment. Recent data add to the weight of evidence for rapid global-scale warming, the dominance of human causes, and the expected continuation of increasing temperatures, including more record-setting extremes. (Ch. 1)

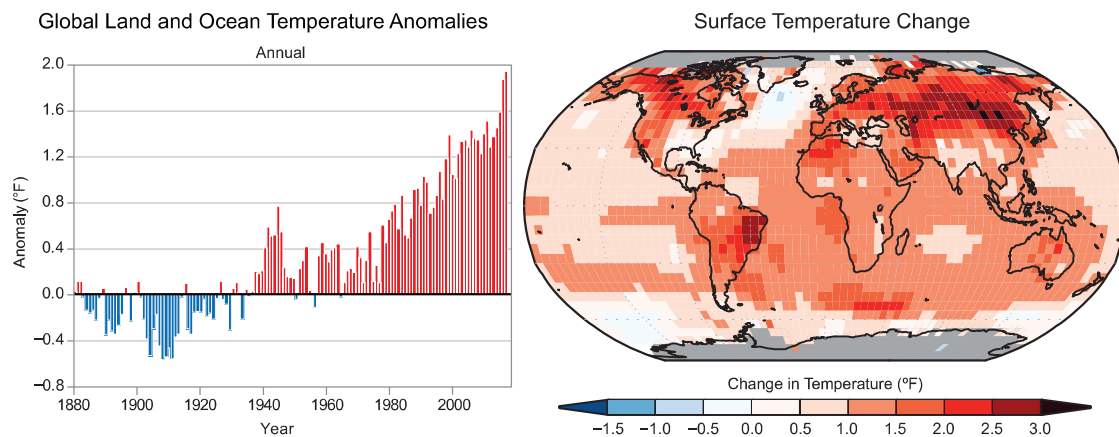


### Changes in Observed and Projected Global Temperature

**The global, long-term, and unambiguous warming trend has continued during recent years. Since the last National Climate Assessment was published, 2014 became the warmest year on record globally; 2015 surpassed 2014 by a wide margin; and 2016 surpassed 2015. Sixteen of the warmest years on record for the globe occurred in the last 17 years (1998 was the exception). (Ch. 1; Fig. ES.1)**

- Global annual average temperature (as calculated from instrumental records over both land and oceans) has increased by more than 1.2°F (0.65°C) for the period 1986–2016 relative to 1901–1960; the linear regression change over the entire period from 1901–2016 is 1.8°F (1.0°C) (*very high confidence*; Fig. ES.1). Longer-term climate records over past centuries and millennia indicate that average temperatures in recent decades over much of the world have been much higher, and have risen faster during this time period than at any time in the past 1,700 years or more, the time period for which the global distribution of surface temperatures can be reconstructed (*high confidence*). (Ch. 1)

## Global Temperatures Continue to Rise

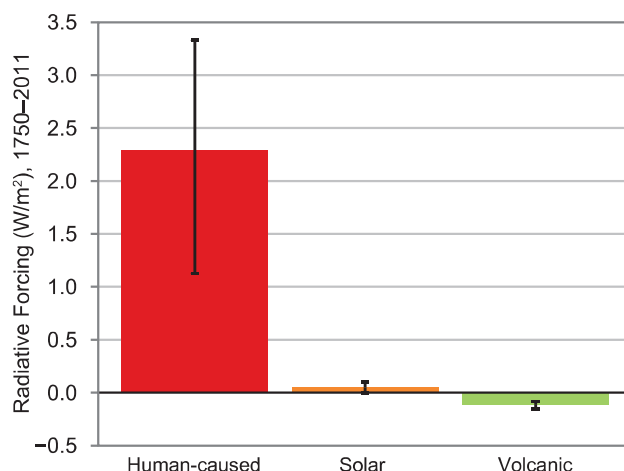


**Figure ES.1:** (left) Global annual average temperature has increased by more than 1.2°F (0.7°C) for the period 1986–2016 relative to 1901–1960. Red bars show temperatures that were above the 1901–1960 average, and blue bars indicate temperatures below the average. (right) Surface temperature change (in °F) for the period 1986–2016 relative to 1901–1960. Gray indicates missing data. From Figures 1.2. and 1.3 in Chapter 1.

- Many lines of evidence demonstrate that it is *extremely likely* that human influence has been the dominant cause of the observed warming since the mid-20th century. Over the last century, there are no convincing alternative explanations supported by the extent of the observational evidence. Solar output changes and internal natural variability can only contribute marginally to the observed changes in climate over the last century, and there is no convincing evidence for natural cycles in the observational record that could explain the observed changes in climate. (*Very high confidence*) (Ch. 1)
- The *likely* range of the human contribution to the global mean temperature increase over the period 1951–2010 is 1.1° to 1.4°F (0.6° to 0.8°C), and the central estimate of the observed warming of 1.2°F (0.65°C) lies within this range (*high confidence*). This translates to a *likely* human contribution of 92%–123% of the observed 1951–2010 change. The *likely* contributions of natural forcing and internal variability to global temperature change over that period are minor (*high confidence*). (Ch. 3; Fig. ES.2)
- Natural variability, including El Niño events and other recurring patterns of ocean–atmosphere interactions, impact temperature and precipitation, especially regionally, over timescales of months to years. The global influence of natural variability, however, is limited to a small fraction of observed climate trends over decades. (*Very high confidence*) (Ch. 1)



### Human Activities Are the Primary Driver of Recent Global Temperature Rise



**Figure ES.2:** Global annual average radiative forcing change from 1750 to 2011 due to human activities, changes in total solar irradiance, and volcanic emissions. Black bars indicate the uncertainty in each. Radiative forcing is a measure of the influence a factor (such as greenhouse gas emissions) has in changing the global balance of incoming and outgoing energy. Radiative forcings greater than zero (positive forcings) produce climate warming; forcings less than zero (negative forcings) produce climate cooling. Over this time period, solar forcing has oscillated on approximately an 11-year cycle between  $-0.11$  and  $+0.19$   $\text{W/m}^2$ . Radiative forcing due to volcanic emissions is always negative (cooling) and can be very large immediately following significant eruptions but is short-lived. Over the industrial era, the largest volcanic forcing followed the eruption of Mt. Tambora in 1815 ( $-11.6$   $\text{W/m}^2$ ). This forcing declined to  $-4.5$   $\text{W/m}^2$  in 1816, and to near-zero by 1820. Forcing due to human activities, in contrast, has become increasingly positive (warming) since about 1870, and has grown at an accelerated rate since about 1970. There are also natural variations in temperature and other climate variables which operate on annual to decadal time-scales. This natural variability contributes very little to climate trends over decades and longer. *Simplified from Figure 2.6 in Chapter 2. See Chapter 2 for more details.*

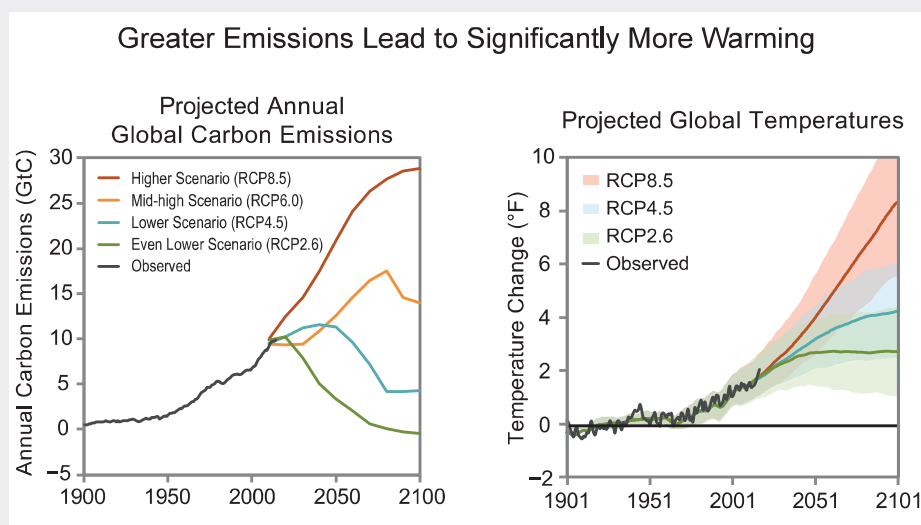
- Global climate is projected to continue to change over this century and beyond. The magnitude of climate change beyond the next few decades will depend primarily on the amount of greenhouse (heat-trapping) gases emitted globally and on the remaining uncertainty in the sensitivity of Earth's climate to those emissions (*very high confidence*). With significant reductions in the emissions of greenhouse gases, the global annually averaged temperature rise could be limited to 3.6°F (2°C) or less. Without major reductions in these emissions, the increase in annual average global temperatures relative to preindustrial times could reach 9°F (5°C) or more by the end of this century. (Ch. 1; Fig. ES.3)
- If greenhouse gas concentrations were stabilized at their current level, existing concentrations would commit the world to at least an additional 1.1°F (0.6°C) of warming over this century relative to the last few decades (*high confidence* in continued warming, *medium confidence* in amount of warming. (Ch. 4)





## Scenarios Used in this Assessment

Projections of future climate conditions use a range of plausible future scenarios. Consistent with previous practice, this assessment relies on scenarios generated for the Intergovernmental Panel on Climate Change (IPCC). The IPCC completed its last assessment in 2013–2014, and its projections were based on updated scenarios, namely four “representative concentration pathways” (RCPs). The RCP scenarios are numbered according to changes in radiative forcing in 2100 relative to preindustrial conditions: +2.6, +4.5, +6.0 and +8.5 watts per square meter ( $\text{W/m}^2$ ). Radiative forcing is a measure of the influence a factor (such as greenhouse gas emissions) has in changing the global balance of incoming and outgoing energy. Absorption by greenhouse gases (GHGs) of infrared energy radiated from the surface leads to warming of the surface and atmosphere. Though multiple emissions pathways could lead to the same 2100 radiative forcing value, an associated pathway of  $\text{CO}_2$  and other human-caused emissions of greenhouse gases, aerosols, and air pollutants has been selected for each RCP. RCP8.5 implies a future with continued high emissions growth, whereas the other RCPs represent different pathways of mitigating emissions. Figure ES.3 shows these emissions pathways and the corresponding projected changes in global temperature.



**Figure ES.3:** The two panels above show annual historical and a range of plausible future carbon emissions in units of gigatons of carbon (GtC) per year (left) and the historical observed and future temperature change that would result for a range of future scenarios relative to the 1901–1960 average, based on the central estimate (lines) and a range (shaded areas, two standard deviations) as simulated by the full suite of CMIP5 global climate models (right). By 2081–2100, the projected range in global mean temperature change is 1.1°–4.3°F under the even lower scenario (RCP2.6; 0.6°–2.4°C, green), 2.4°–5.9°F under the lower scenario (RCP4.5; 1.3°–3.3°C, blue), 3.0°–6.8°F under the mid-high scenario (RCP6.0; 1.6°–3.8°C, not shown) and 5.0°–10.2°F under the higher scenario (RCP8.5; 2.8°–5.7°C, orange). See the main report for more details on these scenarios and implications. *Based on Figure 4.1 in Chapter 4.*

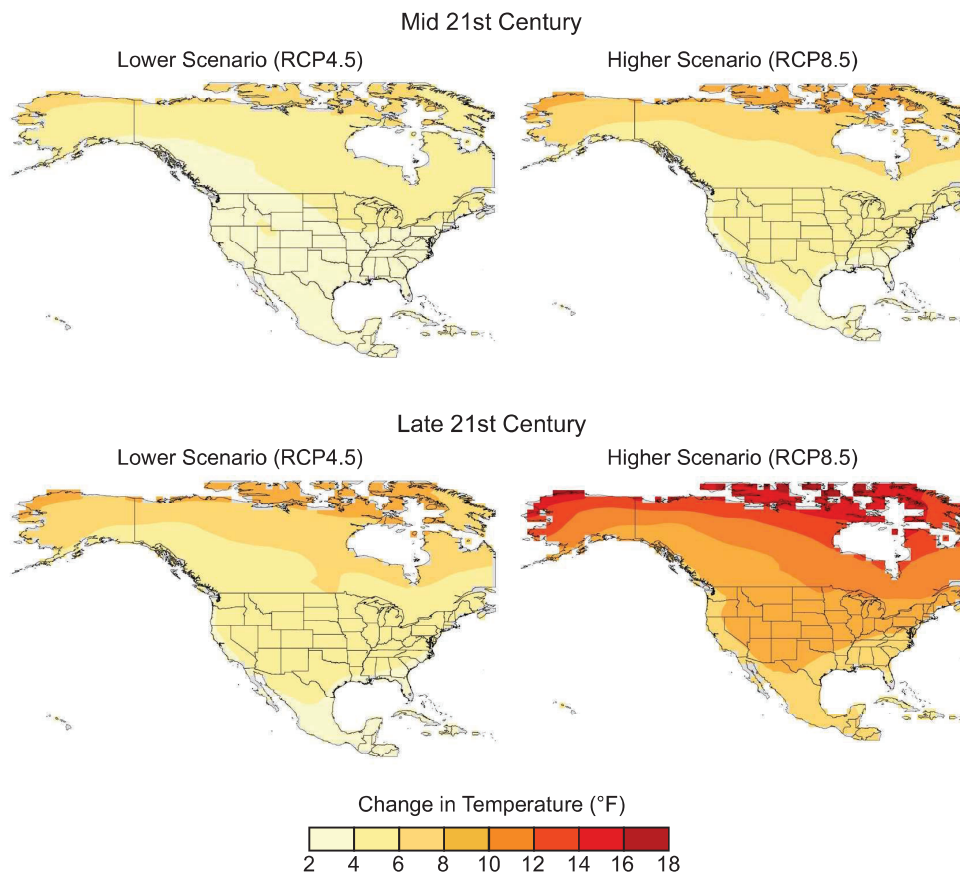
**Changes in Observed and Projected U.S. Temperature**

**Annual average temperature over the contiguous United States has increased by 1.8°F (1.0°C) for the period 1901–2016 and is projected to continue to rise. (*Very high confidence*). (Ch. 6; Fig. ES.4)**



- Annual average temperature over the contiguous United States has increased by 1.2°F (0.7°C) for the period 1986–2016 relative to 1901–1960 and by 1.8°F (1.0°C) based on a linear regression for the period 1901–2016 (*very high confidence*). Surface and satellite data are consistent in their depiction of rapid warming since 1979 (*high confidence*). Paleo-temperature evidence shows that recent decades are the warmest of the past 1,500 years (*medium confidence*). (Ch. 6)
- Annual average temperature over the contiguous United States is projected to rise (*very high confidence*). Increases of about 2.5°F (1.4°C) are projected for the period 2021–2050 relative to the average from 1976–2005 in all RCP scenarios, implying recent record-setting years may be “common” in the next few decades (*high confidence*). Much larger rises are projected by late century (2071–2100): 2.8°–7.3°F (1.6°–4.1°C) in a lower scenario (RCP4.5) and 5.8°–11.9°F (3.2°–6.6°C) in a higher scenario (RCP8.5) (*high confidence*). (Ch. 6; Fig. ES.4)
- In the United States, the urban heat island effect results in daytime temperatures 0.9°–7.2°F (0.5°–4.0°C) higher and nighttime temperatures 1.8°–4.5°F (1.0°–2.5°C) higher in urban areas than in rural areas, with larger temperature differences in humid regions (primarily in the eastern United States) and in cities with larger and denser populations. The urban heat island effect will strengthen in the future as the structure and spatial extent as well as population density of urban areas change and grow (*high confidence*). (Ch. 10)

## Significantly More Warming Occurs Under Higher Greenhouse Gas Concentration Scenarios



**Figure ES.4:** These maps show the projected changes in annual average temperatures for mid- and late-21st century for two future pathways. Changes are the differences between the average projected temperatures for mid-century (2036–2065; top), and late-century (2070–2099; bottom), and those observed for the near-present (1976–2005). See Figure 6.7 in Chapter 6 for more details.

### Many Temperature and Precipitation Extremes Are Becoming More Common

Temperature and precipitation extremes can affect water quality and availability, agricultural productivity, human health, vital infrastructure, iconic ecosystems and species, and the likelihood of disasters. Some extremes have already become more frequent, intense, or of longer duration, and many extremes are expected to continue to increase or worsen, presenting substantial challenges for built, agricultural, and natural systems. Some storm types such as hurricanes, tornadoes, and winter storms are also exhibiting changes that have been linked to climate change, although the current state of the science does not yet permit detailed understanding.



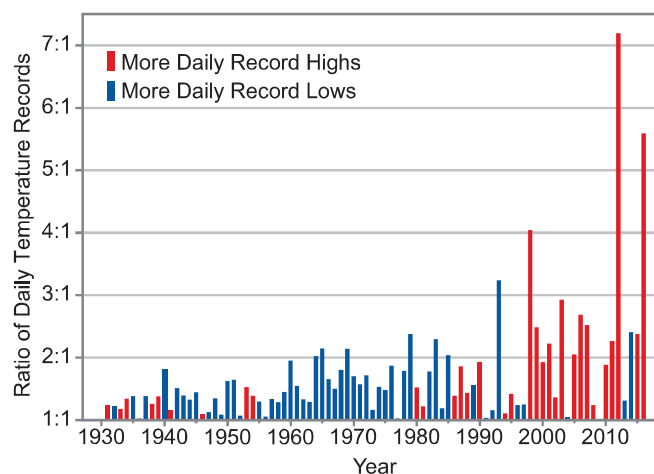
## Observed Changes in Extremes

**There have been marked changes in temperature extremes across the contiguous United States. The number of high temperature records set in the past two decades far exceeds the number of low temperature records. (*Very high confidence*) (Ch. 6, Fig. ES.5)**



- The frequency of cold waves has decreased since the early 1900s, and the frequency of heat waves has increased since the mid-1960s (the Dust Bowl era of the 1930s remains the peak period for extreme heat in the United States). (*Very high confidence*). (Ch. 6)
- The frequency and intensity of extreme heat and heavy precipitation events are increasing in most continental regions of the world (*very high confidence*). These trends are consistent with expected physical responses to a warming climate. Climate model studies are also consistent with these trends, although models tend to underestimate the observed trends, especially for the increase in extreme precipitation events (*very high confidence* for temperature, *high confidence* for extreme precipitation). (Ch. 1)

## Record Warm Daily Temperatures Are Occurring More Often

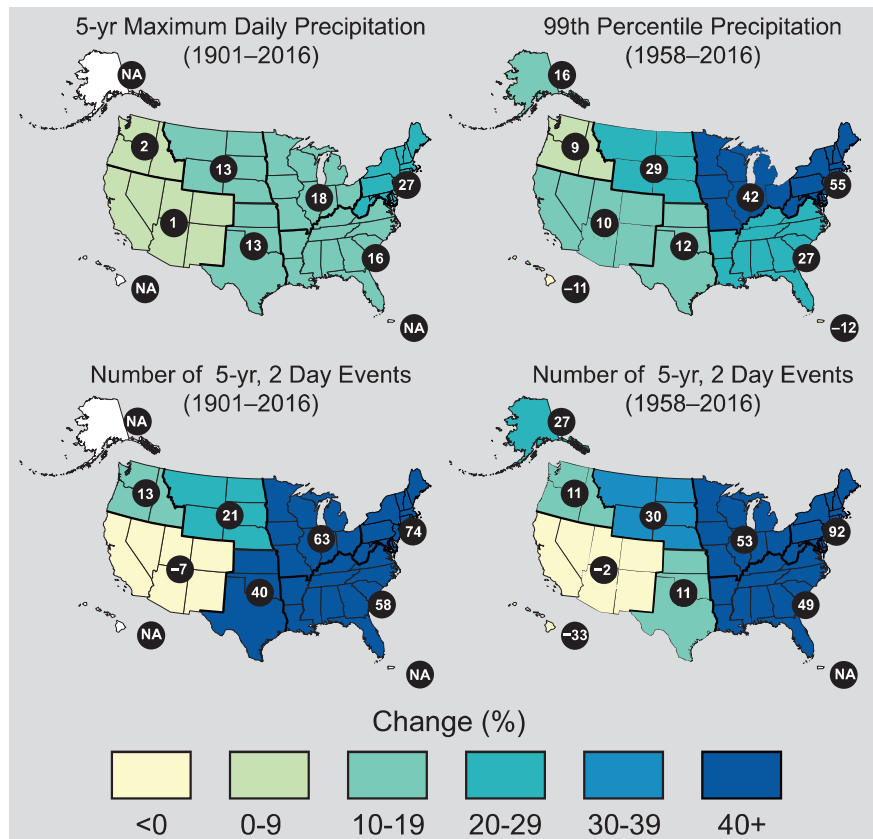


**Figure ES.5:** Observed changes in the occurrence of record-setting daily temperatures in the contiguous United States. Red bars indicate a year with more daily record highs than daily record lows, while blue bars indicate a year with more record lows than highs. The height of the bar indicates the ratio of record highs to lows (red) or of record lows to highs (blue). For example, a ratio of 2:1 for a blue bar means that there were twice as many record daily lows as daily record highs that year. (Figure source: NOAA/NCEI). From Figure 6.5 in Chapter 6.

Heavy precipitation events in most parts of the United States have increased in both intensity and frequency since 1901 (*high confidence*). There are important regional differences in trends, with the largest increases occurring in the northeastern United States (*high confidence*). (Ch. 7; Fig. ES.6)



### Extreme Precipitation Has Increased Across Much of the United States



**Figure ES.6:** These maps show the percentage change in several metrics of extreme precipitation by NCA4 region, including (upper left) the maximum daily precipitation in consecutive 5-year periods; (upper right) the amount of precipitation falling in daily events that exceed the 99th percentile of all non-zero precipitation days (top 1% of all daily precipitation events); (lower left) the number of 2-day events with a precipitation total exceeding the largest 2-day amount that is expected to occur, on average, only once every 5 years, as calculated over 1901–2016; and (lower right) the number of 2-day events with a precipitation total exceeding the largest 2-day amount that is expected to occur, on average, only once every 5 years, as calculated over 1958–2016. The number in each black circle is the percent change over the entire period, either 1901–2016 or 1958–2016. Note that Alaska and Hawai'i are not included in the 1901–2016 maps owing to a lack of observations in the earlier part of the 20th century. (Figure source: CICS-NC / NOAA NCEI). Based on figure 7.4 in Chapter 7.



- Recent droughts and associated heat waves have reached record intensity in some regions of the United States; however, by geographical scale and duration, the Dust Bowl era of the 1930s remains the benchmark drought and extreme heat event in the historical record. (*Very high confidence*) (Ch. 8)
- Northern Hemisphere spring snow cover extent, North America maximum snow depth, snow water equivalent in the western United States, and extreme snowfall years in the southern and western United States have all declined, while extreme snowfall years in parts of the northern United States have increased. (*Medium confidence*). (Ch. 7)
- There has been a trend toward earlier snowmelt and a decrease in snowstorm frequency on the southern margins of climatologically snowy areas (*medium confidence*). Winter storm tracks have shifted northward since 1950 over the Northern Hemisphere (*medium confidence*). Potential linkages between the frequency and intensity of severe winter storms in the United States and accelerated warming in the Arctic have been postulated, but they are complex, and, to some extent, contested, and confidence in the connection is currently *low*. (Ch. 9)
- Tornado activity in the United States has become more variable, particularly over the 2000s, with a decrease in the number of days per year with tornadoes and an increase in the number of tornadoes on these days (*medium confidence*). Confidence in past trends for hail and severe thunderstorm winds, however, is *low* (Ch. 9)

#### Projected Changes in Extremes

- The frequency and intensity of extreme high temperature events are *virtually certain* to increase in the future as global temperature increases (*high confidence*). Extreme precipitation events will *very likely* continue to increase in frequency and intensity throughout most of the world (*high confidence*). Observed and projected trends for some other types of extreme events, such as floods, droughts, and severe storms, have more variable regional characteristics. (Ch. 1)

**Extreme temperatures in the contiguous United States are projected to increase even more than average temperatures (*very high confidence*). (Ch. 6)**

- Both extremely cold days and extremely warm days are expected to become warmer. Cold waves are predicted to become less intense while heat waves will become more intense. The number of days below freezing is projected to decline while the number above 90°F will rise. (*Very high confidence*) (Ch. 6)
- The frequency and intensity of heavy precipitation events in the United States are projected to continue to increase over the 21st century (*high confidence*). There are, however, important regional and seasonal differences in projected changes in total precipitation: the northern United States, including Alaska, is projected to receive more precipitation in the winter and spring, and parts of the southwestern United States are projected to receive less precipitation in the winter and spring (*medium confidence*). (Ch. 7)



- The frequency and severity of landfalling “atmospheric rivers” on the U.S. West Coast (narrow streams of moisture that account for 30%–40% of the typical snowpack and annual precipitation in the region and are associated with severe flooding events) will increase as a result of increasing evaporation and resulting higher atmospheric water vapor that occurs with increasing temperature. (*Medium confidence*) (Ch. 9)
- Projections indicate large declines in snowpack in the western United States and shifts to more precipitation falling as rain than snow in the cold season in many parts of the central and eastern United States (*high confidence*). (Ch. 7)
- Substantial reductions in western U.S. winter and spring snowpack are projected as the climate warms. Earlier spring melt and reduced snow water equivalent have been formally attributed to human-induced warming (*high confidence*) and will *very likely* be exacerbated as the climate continues to warm (*very high confidence*). Under higher scenarios, and assuming no change to current water resources management, chronic, long-duration hydrological drought is increasingly possible by the end of this century (*very high confidence*). (Ch. 8)



**Future decreases in surface soil moisture from human activities over most of the United States are likely as the climate warms under the higher scenarios. (*Medium confidence*) (Ch. 8)**

- The human effect on recent major U.S. droughts is complicated. Little evidence is found for a human influence on observed precipitation deficits, but much evidence is found for a human influence on surface soil moisture deficits due to increased evapotranspiration caused by higher temperatures. (*High confidence*) (Ch. 8)
- The incidence of large forest fires in the western United States and Alaska has increased since the early 1980s (*high confidence*) and is projected to further increase in those regions as the climate warms, with profound changes to certain ecosystems (*medium confidence*). (Ch. 8)
- Both physics and numerical modeling simulations generally indicate an increase in tropical cyclone intensity in a warmer world, and the models generally show an increase in the number of very intense tropical cyclones. For Atlantic and eastern North Pacific hurricanes and western North Pacific typhoons, increases are projected in precipitation rates (*high confidence*) and intensity (*medium confidence*). The frequency of the most intense of these storms is projected to increase in the Atlantic and western North Pacific (*low confidence*) and in the eastern North Pacific (*medium confidence*). (Ch. 9)

## Box ES.1: The Connected Climate System: Distant Changes Affect the United States

Weather conditions and the ways they vary across regions and over the course of the year are influenced, in the United States as elsewhere, by a range of factors, including local conditions (such as topography and urban heat islands), global trends (such as human-caused warming), and global and regional circulation patterns, including cyclical and chaotic patterns of natural variability within the climate system. For example, during an El Niño year, winters across the southwestern United States are typically wetter than average, and global temperatures are higher than average. During a La Niña year, conditions across the southwestern United States are typically dry, and there tends to be a lowering of global temperatures (Fig. ES.7).



El Niño is not the only repeating pattern of natural variability in the climate system. Other important patterns include the North Atlantic Oscillation (NAO)/Northern Annular Mode (NAM), which particularly affects conditions on the U.S. East Coast, and the North Pacific Oscillation (NPO) and Pacific North American Pattern (PNA), which especially affect conditions in Alaska and the U.S. West Coast. These patterns are closely linked to other atmospheric circulation phenomena like the position of the jet streams. Changes in the occurrence of these patterns or their properties have contributed to recent U.S. temperature and precipitation trends (*medium confidence*) although *confidence is low* regarding the size of the role of human activities in these changes. (Ch. 5)

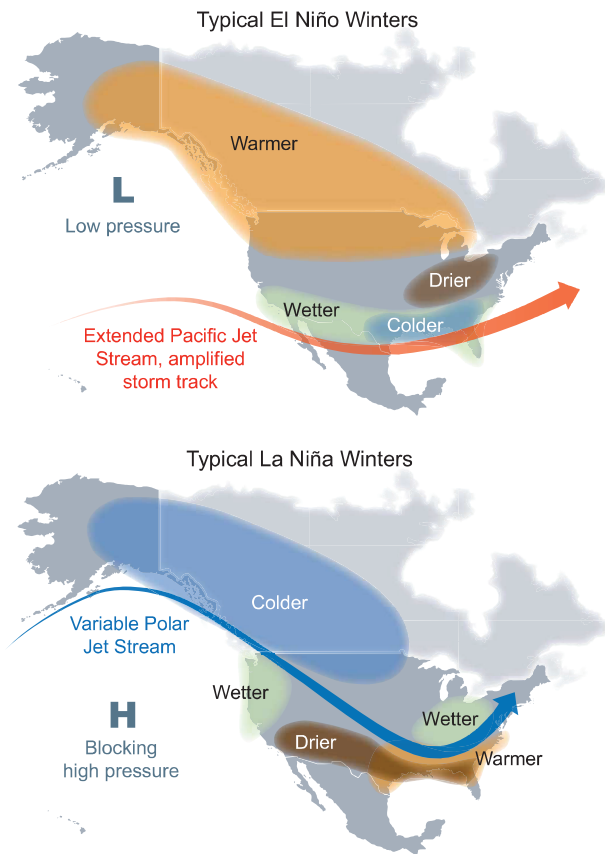
Understanding the full scope of human impacts on climate requires a global focus because of the interconnected nature of the climate system. For example, the climate of the Arctic and the climate of the continental United States are connected through atmospheric circulation patterns. While the Arctic may seem remote to most Americans, the climatic effects of perturbations to arctic sea ice, land ice, surface temperature, snow cover, and permafrost affect the amount of warming, sea level change, carbon cycle impacts, and potentially even weather patterns in the lower 48 states. The Arctic is warming at a rate approximately twice as fast as the global average and, if it continues to warm at the same rate, Septembers will be nearly ice-free in the Arctic Ocean sometime between now and the 2040s (see Fig. ES.10). The important influence of arctic climate change on Alaska is apparent; the influence of arctic changes on U.S. weather over the coming decades remains an open question with the potential for significant impact. (Ch. 11)

Changes in the Tropics can also impact the rest of the globe, including the United States. There is growing evidence that the Tropics have expanded poleward by about 70 to 200 miles in each hemisphere over the period 1979–2009, with an accompanying shift of the subtropical dry zones, midlatitude jets, and storm tracks (*medium to high confidence*). Human activities have played a role in the change (*medium confidence*), although confidence is presently low regarding the magnitude of the human contribution relative to natural variability (Ch. 5).

(continued on next page)

**Box ES.1 (continued)**

**Large-Scale Patterns of Natural Variability Affect U.S. Climate**



**Figure ES.7:** This figure illustrates the typical January–March weather anomalies and atmospheric circulation during moderate to strong (top) El Niño and (bottom) La Niña. These influences over the United States often occur most strongly during the cold season. *From Figure 5.2 in Chapter 5.*



## Oceans Are Rising, Warming, and Becoming More Acidic

Oceans occupy two-thirds of the planet's surface and host unique ecosystems and species, including those important for global commercial and subsistence fishing. Understanding climate impacts on the ocean and the ocean's feedbacks to the climate system is critical for a comprehensive understanding of current and future changes in climate.



### Global Ocean Heat

**The world's oceans have absorbed about 93% of the excess heat caused by greenhouse gas warming since the mid-20th century, making them warmer and altering global and regional climate feedbacks. (Very high confidence) (Ch. 13)**

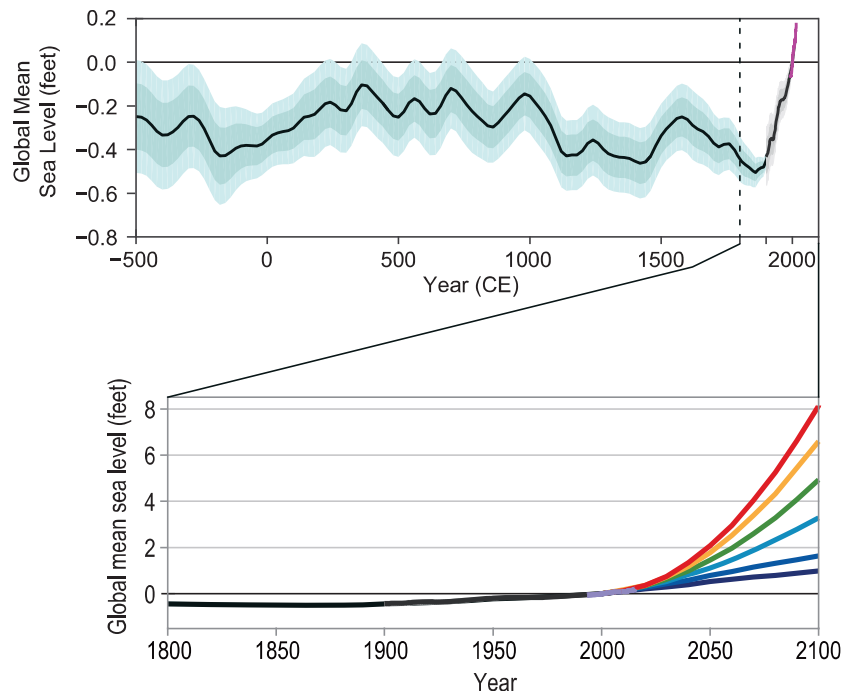
- Ocean heat content has increased at all depths since the 1960s and surface waters have warmed by about  $1.3^{\circ} \pm 0.1^{\circ}\text{F}$  ( $0.7^{\circ} \pm 0.08^{\circ}\text{C}$ ) per century globally since 1900 to 2016. Under higher scenarios, a global increase in average sea surface temperature of  $4.9^{\circ} \pm 1.3^{\circ}\text{F}$  ( $2.7^{\circ} \pm 0.7^{\circ}\text{C}$ ) is projected by 2100. (*Very high confidence*). (Ch. 13)

### Global and Regional Sea Level Rise

**Global mean sea level (GMSL) has risen by about 7–8 inches (about 16–21 cm) since 1900, with about 3 of those inches (about 7 cm) occurring since 1993 (very high confidence). (Ch. 12)**

- Human-caused climate change has made a substantial contribution to GMSL rise since 1900 (*high confidence*), contributing to a rate of rise that is greater than during any preceding century in at least 2,800 years (*medium confidence*). (Ch. 12; Fig. ES.8)
- Relative to the year 2000, GMSL is *very likely* to rise by 0.3–0.6 feet (9–18 cm) by 2030, 0.5–1.2 feet (15–38 cm) by 2050, and 1.0–4.3 feet (30–130 cm) by 2100 (*very high confidence* in lower bounds; *medium confidence* in upper bounds for 2030 and 2050; *low confidence* in upper bounds for 2100). Future emissions pathways have little effect on projected GMSL rise in the first half of the century, but significantly affect projections for the second half of the century (*high confidence*). (Ch. 12)

## Recent Sea Level Rise Fastest for Over 2,000 Years



**Figure ES.8:** The top panel shows observed and reconstructed mean sea level for the last 2,500 years. The bottom panel shows projected mean sea level for six future scenarios. The six scenarios—spanning a range designed to inform a variety of decision makers—extend from a low scenario, consistent with continuation of the rate of sea level rise over the last quarter century, to an extreme scenario, assuming rapid mass loss from the Antarctic ice sheet. Note that the range on the vertical axis in the bottom graph is approximately ten times greater than in the top graph. Based on Figure 12.2 and 12.4 in Chapter 12. See the main report for more details.

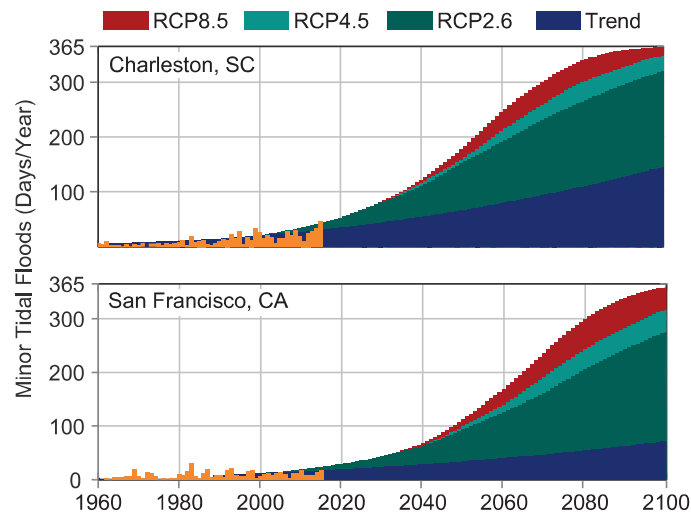
- Emerging science regarding Antarctic ice sheet stability suggests that, for higher scenarios, a GMSL rise exceeding 8 feet (2.4 m) by 2100 is physically possible, although the probability of such an extreme outcome cannot currently be assessed. Regardless of emission pathway, it is *extremely likely* that GMSL rise will continue beyond 2100 (*high confidence*). (Ch. 12)
- Relative sea level rise in this century will vary along U.S. coastlines due, in part, to changes in Earth's gravitational field and rotation from melting of land ice, changes in ocean circulation, and vertical land motion (*very high confidence*). For almost all future GMSL rise scenarios, relative sea level rise is *likely* to be greater than the global average in the U.S. Northeast and the western Gulf of Mexico. In intermediate and low GMSL rise scenarios, relative sea level rise is *likely* to be less than the global average in much of the Pacific Northwest and Alaska. For high GMSL rise scenarios, relative sea level rise is *likely* to be higher than the global average along all U.S. coastlines outside Alaska. Almost all U.S. coastlines experience more than global mean sea level rise in response to Antarctic ice loss, and thus would be particularly affected under extreme GMSL rise scenarios involving substantial Antarctic mass loss (*high confidence*). (Ch. 12)

### Coastal Flooding

- As sea levels have risen, the number of tidal floods each year that cause minor impacts (also called “nuisance floods”) have increased 5- to 10-fold since the 1960s in several U.S. coastal cities (*very high confidence*). Rates of increase are accelerating in over 25 Atlantic and Gulf Coast cities (*very high confidence*). Tidal flooding will continue increasing in depth, frequency, and extent this century (*very high confidence*). (Ch. 12)



### “Nuisance Flooding” Increases Across the United States



**Figure ES. 9:** Annual occurrences of tidal floods (days per year), also called sunny-day or nuisance flooding, have increased for some U.S. coastal cities. The figure shows historical exceedances (orange bars) for two of the locations—Charleston, SC and San Francisco, CA—and future projections through 2100. The projections are based upon the continuation of the historical trend (blue) and under median RCP2.6, 4.5 and 8.5 conditions. *From Figure 12.5, Chapter 12.*

- Assuming storm characteristics do not change, sea level rise will increase the frequency and extent of extreme flooding associated with coastal storms, such as hurricanes and nor’easters (*very high confidence*). A projected increase in the intensity of hurricanes in the North Atlantic (*medium confidence*) could increase the probability of extreme flooding along most of the U.S. Atlantic and Gulf Coast states beyond what would be projected based solely on relative sea level rise. However, there is *low confidence* in the projected increase in frequency of intense Atlantic hurricanes, and the associated flood risk amplification, and flood effects could be offset or amplified by such factors, such as changes in overall storm frequency or tracks. (Ch.12; Fig. ES. 9)

### Global Ocean Circulation

- The potential slowing of the Atlantic meridional overturning circulation (AMOC; of which the Gulf Stream is one component)—as a result of increasing ocean heat content and freshwater-driven buoyancy changes—could have dramatic climate feedbacks as the ocean absorbs less heat and CO<sub>2</sub> from the atmosphere. This slowing would also affect the climates of



North America and Europe. Any slowing documented to date cannot be directly tied to human-caused forcing, primarily due to lack of adequate observational data and to challenges in modeling ocean circulation changes. Under a higher scenario (RCP8.5), models show that the AMOC weakens over the 21st century (*low confidence*). (Ch. 13)



#### Global and Regional Ocean Acidification

**The world's oceans are currently absorbing more than a quarter of the CO<sub>2</sub> emitted to the atmosphere annually from human activities, making them more acidic (*very high confidence*), with potential detrimental impacts to marine ecosystems. (Ch. 13)**

- Higher-latitude systems typically have a lower buffering capacity against changing acidity, exhibiting seasonally corrosive conditions sooner than low-latitude systems. The rate of acidification is unparalleled in at least the past 66 million years (*medium confidence*). Under the higher scenario (RCP8.5), the global average surface ocean acidity is projected to increase by 100% to 150% (*high confidence*). (Ch. 13)
- Acidification is regionally greater than the global average along U.S. coastal systems as a result of upwelling (e.g., in the Pacific Northwest) (*high confidence*), changes in freshwater inputs (e.g., in the Gulf of Maine) (*medium confidence*), and nutrient input (e.g., in urbanized estuaries) (*high confidence*). (Ch. 13)

#### Ocean Oxygen

- Increasing sea surface temperatures, rising sea levels, and changing patterns of precipitation, winds, nutrients, and ocean circulation are contributing to overall declining oxygen concentrations at intermediate depths in various ocean locations and in many coastal areas. Over the last half century, major oxygen losses have occurred in inland seas, estuaries, and in the coastal and open ocean (*high confidence*). Ocean oxygen levels are projected to decrease by as much as 3.5% under the higher scenario (RCP8.5) by 2100 relative to preindustrial values (*high confidence*). (Ch. 13)

#### Climate Change in Alaska and across the Arctic Continues to Outpace Global Climate Change

Residents of Alaska are on the front lines of climate change. Crumbling buildings, roads, and bridges and eroding shorelines are commonplace. Accelerated melting of multiyear sea ice cover, mass loss from the Greenland Ice Sheet, reduced snow cover, and permafrost thawing are stark examples of the rapid changes occurring in the Arctic. Furthermore, because elements of the climate system are interconnected (see Box ES.1), changes in the Arctic influence climate conditions outside the Arctic.